Brigham & Women's Hospital
Radiology Residency Rotation Guide
2021-2022

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Intravenous Contrast Considerations

For more information or when needed as a reference, see the "ACR Manual on Contrast Media": https://www.acr.org/Clinical-Resources/Contrast-Manual

Also, refer to the "BWH/ BWFH/DFCI Guidelines for Assessment and Premedication of Imaging Contrast Agent Allergies" for updated department-wide policy. These are also available on RadCommons.

Contrast Induced Nephropathy (CIN)

1) Pre-existing renal impairment is major determinant
2) If history of renal dysfunction, DM, HTN, SLE, etc., eGFR should be current (within 1 week)
3) If patient is young, no history of possible renal risk, usually don't need current eGFR
4) For both gadolinium based and iodinated contrasts, absolute cutoff is GFR < 30 ml/min/1.73 m^2. However, if the patient is on HD, giving iodinated contrast is okay if study is essential (discuss with team). Even GFR > 30 ml/min, if GFR is downtrending signifying AKI, do not give contrast unless it is an emergent indication and you discuss with team.
5) Only hold Metformin if GFR < 30

Contrast Extravasation

1) Occurs 0.1-0.9% of cases
2) Spectrum of symptoms: from asymptomatic to severe pain, swelling, tightness
3) Major/rare complications: skin ulceration, compartment syndrome
4) Evaluation: 1) stop infusion, remove catheter, elevate extremity. 2) assess how much contrast was actually released (to do that you can look at the scan and estimate percentage of contrast received intravenously based on the degree of enhancement as well as look at the amount of swelling). 3) check for intact pulses, capillary refill, neuro sensation. 4) treat with cold or warm compress (no clear evidence for either), pain meds PRN
5) When to get a plastics consult: if progressive swelling or pain, altered tissue perfusion, change in sensation, skin ulceration or blistering, if more than 100 cc
6) Fill out an incident report, which the technologist can give you, and have the patient sign it

Iodinated Contrast Reactions

1) Acute adverse reaction: Predominantly histamine mediated (very rarely true allergy), occurs within 1 hr (usually quicker), unrelated to amount of contrast administered
    a) Common/benign: warmth, flushing, altered taste
    b) Mild: nausea, vomiting, urticaria, itching
    c) Moderate: more severe N/V, urticaria, bronchospasm, vasovagal
    d) Severe: Hypotensive shock, pulmonary edema, respiratory/cardiac arrest
2) Risk factors: asthma, other severe allergies, **shellfish allergy is NOT a risk factor
    a) Allergy to Povidone-iodine is not a contraindication for use of iodinated contrast material
3) Patients should be observed for at least 1 hr; if Benadryl is given, patient should not drive home
    a) Allergy should be entered into patient's medical record; usually write a short note as well, particularly if treatment is given
    b) If mild allergy, will need to receive premedication prior to future iodinated contrast studies
    c) If moderate allergy, no iodinated contrast should be given until patient seen by the Allergy & Immunology
    d) If severe allergy, no iodinated contrast should be given (even with premedication treatment)

Premedication (Source: "BWH/ BWFH/DFCI Guidelines for Assessment and Premedication of Imaging Contrast Agent Allergies"):

1) Accepted elective pre-medication regimen for outpatients with a history of allergic like reaction to iodinated contrast or gadolinium

I. Three Dose Protocol (Preferred)
• 50mg Prednisone PO 13, 7 and 1 hour(s) before contrast administration.
• And 10 mg Cetirizine* (Zyrtec) PO 1 hour before contrast administration. *or* 50 mg Diphenhydramine (Benadryl) IV within 1 hour of contrast administration

*Cetirizine is considered non-sedating, Diphenhydramine is considered sedating.

2) Accepted elective pre-medication regimens for inpatients/ER patients with a history of mild/moderate allergic like reaction to iodinated contrast or gadolinium

"Expedited" Protocol (Preferred)
• 200 mg Hydrocortisone sodium succinate (Solu-Cortef) 200 mg IV 5 hours and 1 hour prior to the study
• 50 mg Diphenhydramine (Benadryl) PO, IM, or IV within 1 hour of contrast administration.

Note: This protocol should not be used in patients with a history of severe prior allergic like reaction without an allergy consultation. Additionally, patients with a gadolinium allergy should undergo the standard 13-hour oral prep.

Gadolinium Contrast Reactions

1) Very Rare
2) Biggest concern is nephrogenic systemic fibrosis – generally gadolinium is contraindicated if patient is on dialysis and if GFR < 30 (though with proper consent we do administer it from time-to-time, but always needs attending discussion)
3) Dotarem is preferred in cases of low GFR - Note that NSF has really only been demonstrated in patients with severe renal failure with the use of older, linear gadolinium agents (OptiMARK, Omniscan, Magnevist)
4) Extravasation is treated as above

Clearing Orbits

1) Metal workers only need orbit films if they have gone to a doctor for eye trauma, otherwise you can technically clear them without films (most people don't but you can)
2) All patients who cannot verbalize prior history and for whom MRI clearance history cannot be obtained require orbit clearance with plain film or contiguous slice CT or MRI.
3) No metal can be seen within the orbit on plain films. Metal outside the orbit is generally ok but probably should be run by an attending.
4) You can clear with a CT or MRI provided the slices are contiguous (i.e. OK to use BWH CT; for MRI and outside hospital CT, you need to get orbit films)

Clearing Pain Pumps

Review plain film, the pump cannot be oriented 90 degrees to the z-axis (i.e. should not be perpendicular to the body wall). The device must also be MRI safe/conditional

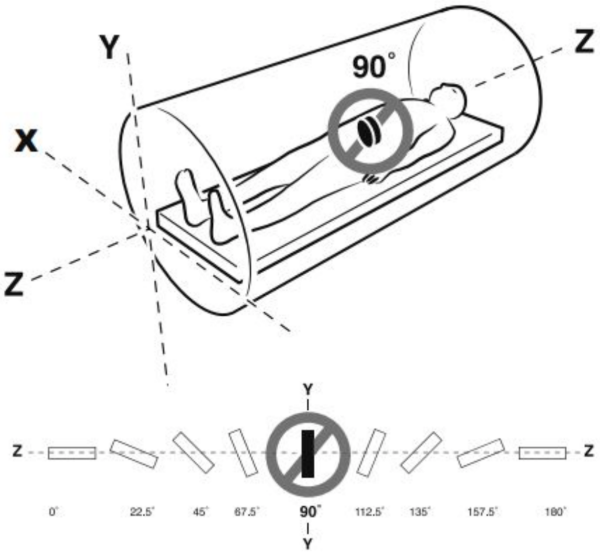


Figure 1. Pump positions in relation to z-axis MRI orientations

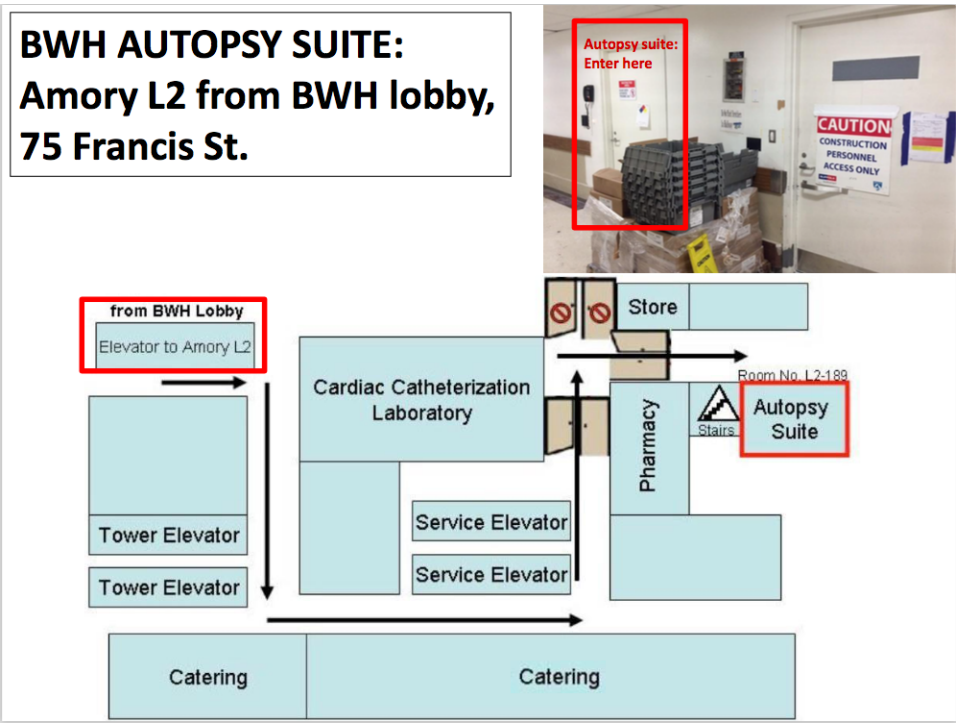
In other words, as long as baclofen pump does not look like a "hockey puck" on abdominal radiograph, patient can have MRI

Retained Object (specific for Ob/Gyn OR studies)

Retained Object plain films for Ob/GYN OR studies (e.g. XR Retained Object – Abdomen) now require an attending final sign as soon as possible. Please make sure to prioritize these studies and read out with your attending as soon as possible. If you're on after-hours without an abdominal attending available to final-sign, please promptly review with an ED staff attending who will finalize the report.

Autopsy Conference
Who: First-year residents

Location: Morgue, L2 (incredibly hard to find, ask a second-year or upper level on your rotation to show you). *During COVID, this was done entirely virtually via Teams*



Schedule: Monday 8am, Wednesday 8am, Friday 9:15am. May or may not happen depending on pathology caseload. The pathology coordinator will email the afternoon before (or Friday afternoon for Monday conference) to let you know if there is an autopsy conference or not and will email you the MRNs of the decedents.

Notes:
1) Prepare a 5-10 minute PowerPoint presentation of relevant images. Feel free to email the pathology resident on autopsy that week to get a sense of what the leading diagnoses are so you can be sure to present supportive/relevant images.
2) If it's something you don't feel comfortable with presenting (eg., abdomen MR), you can ask an upper-level to quickly review the findings with you.
3) It is a pretty laid back conference and they know you are a first-year so they don't expect you to have all the answers or know everything.
4) It's a great experience because you get to see the Rad-Path correlations.
5) Email your PowerPoint to the pathology resident on autopsy that week, and s/he will have it up on the computer when you get there. (If this continues to be remote, just use Share Screen function on Teams)
6) Your schedule is on the call schedule on Amion. You'll have about 5 weeks in total between first-year and early second-year.
7) Be sure to tell your attending the day before so they know you will be away from the reading room for an hour or so.

Rad-Path Conference

Who: First- and second-year residents

Location: Abrams/Zoom (Katie Garney will send link)

Schedule: Once per month during noon conference at 12:15pm (each resident presents once)

Notes:

1) Rad-Path dates and the responsible residents for each conference will be provided by the chief residents, find the assigned dates on Amion.
2) The minimum number of cases is 4, but 5 is preferred. Conference format is left to the discretion of the presenting team (i.e. present all cases followed by didactics based on a theme versus present individual cases followed by short didactic for individual cases).
3) Cases should be from the past 5 years (at least most of them)
4) Pathology resident should be contacted at least 1 month prior to the conference to ensure adequate time to retrieve and confirm availability of pathology slides, but the earlier the better
5) Pathology needs to be from the same patient as the imaging
6) Gross pathology should be included for as many cases as possible
7) Cases must be discussed with Dr. Angela Giardino 2 weeks before conference either in person or via email
8) Cases must be emailed out to the residents as "unknowns" prior to the talk – all residents should preview the cases prior to conference
9) Appropriate staff based on the conference theme should be invited by the resident to attend conference (i.e. for a presentation on supratentorial brain tumors, consider inviting Neuro faculty)

Pro-tips:

- *Have the pathology resident find 8-10 potential cases first; not everyone with great images has corresponding path, but almost everyone with path has imaging!*
- *There are tons of great examples of prior resident presentations on the Rad Commons Website (http://stage.radcommons.org/residents/rad-path.htm)*

Contact: Angela Giardino, M.D.

Med Conference

Who: R2-R4
Location: Previously in 15A conference room. At the time of this writing, Med Conference is hosted over Zoom. You will receive a Zoom link in your email
Schedule: 10:30am – noon. Typically scheduled for every Tuesday and Thursday you are scheduled for sick call (generally 2 weeks per year, check Amion for shifts)

Notes:

1) Currently, this is hosted over Zoom. You will receive a link to the zoom conference the day before sent by one of the Medicine admin staff. You can sit in your reading room or go to another spot (ex Mellins if available), log into Zoom and wait to see if anyone drops in (some days no one drops in; these are like "office hours"). If they do drop in, they ask you to review a study or answer some questions. You can share your screen to show them some findings if you wish. Otherwise, if this is in person again please look below.

If in person again instead of over Zoom:

2) On the day of medical consult rounds, report to 15A conference room by 10:30am (take tower elevators to 15th floor, turn right towards unit 15A, conference room should be on your right (before patient rooms appear – if you've gone to reception desk/nursing area, you've gone too far). The code to the room is written on the left-hand side of the door (look up). Once you arrive, prepare by logging into the desktop on back left hand corner (which is connected to the projector). Turn on the projector.
3) You will need to access Visage PACS via CITRIX on the desktop. You can locate this by 1) click on the Partners Application button near the start menu and go to "MY CITRIX APPS", or 2) open Internet Explorer and go to https://workspace.partners.org.
4) Medical teams will start coming in starting at 10:30am until 12 (two ICU teams + General medicine service). Each team has about 15 minutes to go over any imaging studies of their patients. They may have specific questions or ask you to show them the finding, and depending on time you can teach them one or two interesting things about the findings for the case or protocols/etc.
5) Sometimes the teams ask you give a wet read on a study that was doesn't have a formal read yet, and you can definitely provide some clinically meaningful information if you feel confident, but would recommend referring the teams to the subspecialty reading rooms for complex cases and/or if you're not sure about the findings to avoid conflicting information being relayed.
6) This is a very low-key environment and really just a session to learn from each other's specialities – you can totally ask them management questions for your own learning too!

New England Roentgen Ray Society (NERRS) Conference

Educational lectures from renowned local, national and international speakers covering contemporary topics in radiology. Nothing to prepare for on your end. Just show up.

Who: All radiology residents from the different New England residency programs attend this meeting.

Location: Harvard Conference Center, 77 Avenue Louis Pasteur, Boston, MA
**On Zoom during COVID*

When: Friday, 3:15 – 6:45pm (you are excused from the reading room at 3pm). 6 sessions per year.

HMS Teaching

There are many ways to be involved in teaching medical students during all four years of residency. Many of these were on hold during COVID, TBD on whether they will be returning. Some of the options are included below:

Core Clerkship in Radiology:

Website for reference: https://www.brighamandwomens.org/radiology/education-and-training/medical-student-radiology-clerkship

As a first- and second-year, you will be assigned to lead several structured didactics and jeopardy review sessions. These take place in the Medical Student Classroom (a few floors down from Mellins Library). They include HMS Intro GU ("Rad Lab 4 Unknowns: Genitourinary"), HMS Final Jeopardy, and HMS Anatomy Jeopardy. The PowerPoint presentations can be downloaded from the Dropbox for BWH Radiology Residency (see login info included in "Important Websites" section).

Foundations of Imaging in the "Transitions" course:

Typically held in August. After an introductory lecture, students will break out into small group discussion sections. Three radiologists staff the small group sessions each day. All of the materials are provided. The material is very basic, covering chest and abdomen.

Gross Anatomy in the "Transitions" course:

Typically held in August and September. HMS students will be learning clinical anatomy in the gross anatomy lab alongside both anatomists and radiologists. The curriculum is designed for both larger group and small group radiology sessions that will accompany the anatomy prosections on each class day. Three radiologists lead the discussions for each session. All materials will be provided ahead of time and include both normal studies and very basic pathology. Run by Sara Durfee, Jen Uyeda and Shanna Matalon.

"Fundamentals of Imaging" course:

Typically held in September and October. Six radiologists are needed for each session.

Coordinator: Stacey Chiacchio **Contact:** Sara Durfee, M.D., Angela Giardino, M.D.

Abdomen

See Abdominal Imaging and Intervention SharePoint website for additional information: http://sharepoint.partners.org/bwh/bwhabdominalimagingandintervention (VPN/Partners login required)
Location: L1 (take right off Amory elevators, door on right approximately 2/3 down hall, walk into interventional CT control area and take door on right into reading rooms; diagnostic reading room is the back reading room (CSIR is in the front), CT section is on wall opposite control area wall).
Hours: Monday-Friday, 8:30am – 5pm

Conference:

1. Interesting Case Conference, Daily @ 3:30/4 pm
2. Tuesday Morning Guest/Fellow Conference: 7:30 am (in lieu of AM conference on Grand Rounds days)

Typical day:

1. Have an upper-year resident explain where to sit on the first day (CT one half, MRI the other)
2. EPIC protocol list (CT abdomen): BWH Abdominal CT
3. Visage worklist: ABD CT MR New

Responsibilities:

- Reading studies
    - Focus on CT during the first part of the rotation, then can shift to MRI too.
    - Prioritize inpatient and STAT studies.
    - Read only outpatient studies that come over before 4:00pm. Inpatient studies until 5:00pm.
    - You will read out with attendings intermittently throughout the day, sometimes with only 1-2 CTs, attending preference.
    - Techs may call asking to confirm studies are of good enough quality, or regarding adrenal CT protocols.
        - For Adrenal CTs: They want you to place an ROI on the adrenal lesion of interest. If it is < 10 HUs, you can tell them to stop the study. If it is > 10 HUs, then they can proceed with the contrast enhanced portion of the study.
        - For other studies (colonography), ask an attending or fellow to look at the images to see if they are going to be diagnostic.
- Protocoling
    - Everyone works together to protocol studies. All studies scheduled for the next 7 days should be protocoled by the end of the day. You will spend much more time assigning protocols here than on other sections. Have an upper-level go through the protocols with you during your first few days so you understand. Also ask an upper-level when you don't know which protocol to assign.
    - If you are looking into a protocol, make a note in the protocol box with ".i" so that other people and techs know that you have already looked into it. ".i + space" inserts your name and the date.
- Answering the phone
    - Call burden is shared between residents and fellows.
    - Ask an upper-level or fellow for help if you need help with protocol, prelim read, adrenal protocols etc.

OSCE: OSCE sent to you during your last week to complete at home via online site. Then you will review your submitted answers with an attending (usually the resident liaison).

Official Reading:

- Journal articles for reference in SharePoint

Resident Recommended Reading:

1. Webb/Brant: Fundamentals of Body
   Available online via Countway
2. Mortele CT & MRI of the Abdomen and Pelvis: A Teaching File
   Can get from an upper-level electronically
3. Christopher Roth: Fundamentals of Body MRI
   Available online via Countway
4. Lee & Sagel: Computed Body Tomography with MRI Correlation
   Available at Countway in hard copy only:
   http://id.lib.harvard.edu/aleph/010521306/catalog

Review Reading: Core Radiology by Jake Mandell

Miscellaneous: If assigned to peer-to-peer pager: Call page operator at x26660 and piggyback/add pagers #11369 and 32607 to your pager.

Notes: Hot/cold water in the CT/MRI waiting room, fridge/microwave in the kitchen area behind the waiting room.

Contact (liaison): Lauren Roller, MD

Angio-IR
(See additional "Angio/IR Supplement" on http://stage.radcommons.org/residents)

Contact: Tim Killoran, M.D.

Location: L2 - take the Amory elevators and take a right out of the elevators. The second door (with a frosted glass window) on the right past the IR nurse room is the IR reading room. Use your ID to get into the room.

Hours: Monday-Friday, ~6:30/6:45am – 5-7pm (whenever cases are done; typically person on call takes the last case) + 1 weekend of call (which goes from Friday at 7am – Monday at 7am.) May have 4 weekdays of call instead.

Conference: Wednesday 7:30am and Thursday 7:30am, although variable depending on staffing

Patient Lists: BWH Interventional Radiology Consult
Snapboard: BWH IMG IR ANGIO/NEURO Exams
Snapboard depot: BWH IMG IR ANGIO/NEURO Tech Scheduled Orders

Important numbers:
Angio/IR on-call pager: 11801
(you need to call the page operator at 617-732-6660 - or just 00 when in hospital - to have this forwarded to you when you're on call)
Angio/IR work area (charge nurse/lead tech): 617-732-7245 Angio/IR on call nurse: p13612
Angio/IR on call tech: p11475
CSIR pager: p14520
Anesthesia consult: p33300, or call OR desk x71000 and ask for Anesthesiologist on call
BWH main number: 617-732-5500
Angio/IR reading room workstations: x27985, x27984
Angio/IR scheduling: 617-732-7240

Things you need before you get started
- Lead! That fits, and a place to hang it.
- There is common lead hanging out in the hallway near rooms ½ that is free to use. On your first day, take the time to find a top, bottom, and thyroid shield that fit well and set them aside to use during the rotation. There are available hooks on the far side of the control room near the break room.
- Lead glasses (you can borrow one of the resident pairs).
- HI-IQ Access to chart outcomes (email Frantz Pierre ahead of time to get account access)
- Store room access (email Lauren Scannell with numbers on back of ID)
- SmartPhrases: copy relevant Angio/IR SmartPhrases from one of the fellows/PAs (consult note, brief op note, line pulls, DC instructions).
- Order sets (pre and post-procedure sets).
- Brigham scrubs (there are scrub machines with badge access on L1, L2 and 2).

Intro to suites
- There are 4 suites in L2 and 2 neuro suites upstairs
    - 1-2 generally for angio/IR cases and 3-4 for lines (run by the PA's), with some exceptions when things are busy and get moved around.

Things to know

- How to gown/glove yourself (majority of cases are done in sterile environment)
- How to cone in/move the table.
- How to take a picture or save a fluoro run.
- How to draw up saline and contrast
- How to flush/prep catheters

Specifics

- Leave ALL dictations in DRAFTS. DO NOT SIGN ANYTHING.
- In order to dictate a line pull, you need to ask a tech to start/stop the encounter.
- Follow SIR anticoagulant guidelines, but ask attendings to confirm.
- You need to add yourself as a resource for EVERY DAY that you are on the rotation, so that you can "assign" yourself to cases.
    - This can be done from the Snapboard. The little arrow on the left of the screen opens a panel. Green plus sign at the top allows you to add "Radiology Resident", then search for/select yourself).
    - OR you can call IT and ask them to add you permanently.
- Blood cultures must be clear x48 hours before any venous access procedure.
- Various types of lines, what is an indication for each.
- Any cultures/anatomic pathology or any other lab must be ordered by primary team BEFORE the procedure begins.

What to wear

- Bouffant (over hair or other scrub cap).
- Mask
- Hats and masks should be changed in between each case
- Eye protection, preferably lead glasses
- Lead including thyroid shield. MAKE SURE YOUR DOSIMETER IS OUTSIDE YOUR LEAD.
- Booties, if need be
- You will need sterile gloves and gown. Just stick your head into the room to let the scrub tech know you will be in there/what size you are.

Workflow of a typical day

- 6:30 a.m.: Arrive early enough to consent any outpatients and add-on inpatients that need to be consented in the CVRR (scheduled inpatients should have been consented the night before). Chart check inpatients we are following and update the handoff with pertinent I/O's and labs ("BWH Interventional Radiology Consult" list). You should also load imaging studies for that day's cases (excluding line cases) on the PACS workstation so it can be projected during rounds.
- 7:30 a.m.: Table rounds with attendings, fellows/residents, nurses, techs, and that day's anesthesiologist in the reading room. All the day's cases are presented by the people whose names are assigned (resident/fellow, PAs for lines). For line placement, state the type of line, why we are placing, h/o prior lines, side we'll be placing or TBD, whether or not anesthesia consult is required, and any other pertinent medical info (e.g. allergies, code status, if patient can't lay down flat). For all other cases, state procedure, brief HPI, whether or not anesthesia consult is required, and any other pertinent medical info (e.g. allergies, code status, on any anticoagulants, if patient can't lay down flat).
- 8:00 a.m.: (immediately following that day's case rounds): Inpatient rounds where the fellow usually refers to the handoff and updates the attendings on the inpatients. Usually very brief.

- 8:30 a.m.: Cases usually start around this time. Go in on your cases as they come. Feel free to go in on any other case, just ask beforehand whether you can scrub in or not.
- 5:00 p.m.: Get a sense from On-call person how things are going. If multiple rooms are still running, you should stay and help unless specifically told to go home. Update them about any outstanding issues before you leave.

Work to do during the day

Fellows/residents work up cases on inpatients as consults are received that day, and the cases on outpatients that are scheduled for the next day (ALL CASES should have a name assigned and be thoroughly worked up prior to the next day's morning rounds).

If you are "on call" or "on consult", try to help with the pager throughout the day, responding to requests for line pulls and going to see/consent consults. Staff with available attending.

The PAs will generally work up the outpatient lines scheduled in rooms 3 and 4. Any case that does not have a name assigned is up for grabs.

Things to know while working up patient:

- Are the patient's vitals stable
  - Can the patient tolerate conscious sedation? Consider MAC/GA
  - Allergies, particularly to iodinated contrast, lidocaine, propofol, fentanyl
  - Is the patient consentable? If not, do they have a HCP?
  - Code status: May need to do DNR/DNI reversal for procedure
  - NPO status: at least 6 hours
  - Anticoagulation: what are they on, when was their last dose
  - Labs (CBC, INR, K+, Cr) and blood cultures

For all cases, there are various pre-procedure and post-procedure tasks to do (ask someone to show you the steps for the first few times):

Pre-Procedure

- These steps ONLY apply to inpatient cases
  - Ordering MD pages the consult pager with request for Angio/IR procedure
  - Before calling the team back, look through Epic (make sure to open the patient's "Hospital Chart" if inpatient) and gather the following: HPI, current medications (any anticoagulants, opioids, antibiotics, pressors), labs (specifically WBC, Hgb/Hct, PLT, PT/INR, Cr, blood cultures), pertinent imaging, prior IR procedures, reason for consult.
  - Call back the ordering provider/responding clinician to discuss the order and discuss any immediately apparent issues (anticoagulation, PT/INR, NPO status?, indication, timing, etc.).
    - If the patient is on an anticoagulant, refer to the SIR Anticoagulants Consensus Guidelines and bring it up with the attending.
    - Blood cultures have to be clear for 48 hours prior to placing a venous access device (tunneled line)
  - Discuss the case with attendings to see if its approved
    - If yes, call the team back to let them know and proceed to following steps
    - If no, then still let the team know the reasoning and write a consult note to document the discussion.
  - Have ordering MD place Epic order for "IP Consult Angio/IR" (not needed if request is for venous access or IVC filter) and also any pertinent orders if biopsy is being taken, fluid sent, or catheter tip being sent for culture

    - Place order for procedure. Ordering MD places orders themselves for the following procedures: "IR Venous Access Placement," IR IVC Filter Placement," and IR Peritoneal Permanent Catheter."
    - Ask the head RN to move the ordered procedure from the depot ("BWH IMG IR ANGIO/NEURO Tech Scheduled Orders") to the Snapboard to schedule it
    - Go and see patient and write consult note (make sure to associate note with Epic order for consult). Use the smart phrase .irconsult SmartPhrase
- These steps apply to BOTH inpatient and outpatient procedures
    - Assign yourself to the case (right click on case in the Snapboard and assign yourself)
    - Protocol order (right click on case in the Snapboard and "Update Protocols")
    - Use "IR Nonvascular PreProcedure" or "IR Vascular PreProcedure" order set
        - There isn't much to change in the order sets except you will have to select an antibiotic for surgical prophylaxis (as below and posted in IR Reading Room). Sign & Hold orders (to be activated by RN when patient in pre-op status).
            - Download the SIR medication guidelines app to help with this
    - Fill out Pre-Sedation Evaluation
        - Fill out the ROS/Med Hx
        - Add summary of HPI at the top and include information about pertinent labs, allergies, prior venous access (if applicable), prior sedation and doses (if applicable), code status
        - Fill in physical exam - Includes evaluation of airway (Mallampati score), CV, Pulm, Neuro
        - Fill in the Sedation Plan - Include ASA score
        - Sedation Plan
            - If you have questions about if IVCS is appropriate for patient and think Anesthesia should evaluate the patient, you can request Anesthesia consult (In the Snapboard, right click on the case and under "Events" select "Anesthesia Consult")
    - Medication Plan
        - Usually select: Versed 0.5 mg IV (and PRN titrate), Fentanyl 25 mcg IV (PRN titrate), and select other PRN and reversal agents listed just in case
    - "Share" note (so others can use it if they end up consenting the patient)
    - Consent patient (if not already done) and complete / sign Pre-Sedation Eval
        - Procedure-specific consent forms are located in stacks in the reading room
        - For outpatient consented in CVRR, leave consent form on the patient's side table with other paperwork
        - For inpatient, bring consent form back to Angio/IR and put it in the day's black plastic hanging folder (on the wall near room 4)
    - Update Snapboard with the "Consent obtained" icon (right click on the case and under "Events" select "Consent obtained") and you can also let the day's head RN know as well

The Case

- You can scrub into cases you worked up, and even those you didn't but want to see. Just talk to the fellow/PA who is assigned to the case.
- Scrub into case (put on lead, scrub cap, eye protection, and mask before going into the room)
- Let the room tech know you will be scrubbing in so they can make sure a gown is ready and leave gloves out for you

Post-Procedure

- Within the Post Procedure tab, select the appropriate tab at the top: "Post Procedure Discharge" (if outpatient), "Post procedure Back to Floor" (if inpatient), and (rarely) "Post Procedure Admit" (usually used for TACE and Y-90 patients)
- Complete Brief Op Note (use .irpost SmartPhrase)
- Complete Discharge Med Rec
- Fill out Additional Patient Instructions for AVS (get pertinent SmartPhrases from the PAs/fellows)
- Complete more comprehensive procedure note in PowerScribe (use the harmonized Angio/IR templates) and leave in draft
    - To do this, the tech will have to mark complete the procedure first (turns gray).
    - Search for the MRN or accession number then select the procedure you did to open a blank report.
    - The tech will come into the reading room and hand you a slip with the technical information you need to complete the report, including amounts of Versed, Fentanyl, and contrast (used and wasted), Sedation Time, Fluoro Time, cumulative dose, DAP, device lot #, etc. The techs will put all of this information on a little slip and give it to you or the fellow
- Update HI-IQ procedure entry (see below for more details)
- If an inpatient case that is not vascular access, add patient to BWH Interventional Radiology Consult patient list
- If a follow up procedure is needed, then: Open a "Orders Only" encounter (via top Epic task bar > "Order Entry" button on left-hand side) and order the pertinent IR procedure
    - PCN check/exchange: q3 months
    - G/GJ tube exchange: q6 months
    - Perc chole: if acalculous, q6 weeks; if calculous, q3 weeks or until gallbladder removed
    - Biliary: usually q3 months (can discuss with attending)
    - Email "BWH Angio Scheduling" in Outlook with relevant details (name, MRN, procedure, timing) so they can officially schedule it

CVRR Checks

- PCN Checks
    - Is the tube completely out?
    - Is the suture in place?
    - Has it been capped, or to a bag?
    - Does the tube drain and flush easily?
    - Any concerning signs? Fever/chills, flank pain, pain with flushing
    - Imaging? Either US or KUB showing position
    - If evidence of dislodgement, exchange should be considered
- Port Checks
    - Does the site look infected?
    - Is there skin breakdown?
    - If evidence of infection, should be added on for port removal

Chest

Location: Peter Bent Brigham (near 15 Francis St), 2nd floor (off the Pike and below Mellins)

Hours: Monday-Friday, 8:30am – 5pm

Conference:

1) Usually 30 minutes each morning, the attending will gather the residents at a random time for an educational conference
2) Thoracic Surgery Conference: Wednesday 7:00am

Typical day:

1) Schedule posted at each workstation shows which list you will be reading from (inpatient, ambulatory, or ICU plain films or CT) and which attending you will read you out.
2) EPIC protocol list for CT: BWH/BWFH Thoracic CT
3) Have an upper-year resident explain the schedule and where to sit on the first day
4) Read only plain films for the first two weeks and a mix of CT and plain film last two weeks (see below)

Responsibilities:

- Andi will give a mini orientation and review expectations on the first day of your first rotation
- Mark will send you a "Goals/Expectations for Residents on Chest Rotation" ahead of time, which includes suggested reading and volume expectations:

First Year

daily volume	*Week 1*			*Week 2*	*Week 3*			*Week 4*
	Day 1	Day 2	Days 3-5	Days 1-5	Day 1	Day 2	Days 3-5	Days 1-5
CXR	30	40	50	50	25	25	25	10
CT	0	0	0	0	4	5	5	10

1) Protocoling
   a) Protocol studies when on CT (have upper-year explain protocols to you first)
   b) PE studies can be ordered either as "Pulmonary Angiogram" or "Angio Chest" but be sure the indication is for PE, otherwise all CTAs go to Cardiovascular Radiology
2) Answering phone calls
   a) Answer your phone and generally only your phone
   b) If called for a prelim for a post-op discharge (from the PACU), get the attending (required for post-op discharge)
   c) If called for a general prelim read, check concerning findings with attending immediately
3) Journal Club
   a) The last Friday of the month you will be responsible for presenting an article for Journal Club. Run the article by Andi or Mark (email is ok) before working on your presentation to make sure it hasn't been presented before.

b) One resident may be assigned the consult pager during workday hours (Laura Freeman will email you). Answer all protocol and consult questions. For biopsy requests, take down the patient information and requesting clinician and notify the fellow in the room assigned to biopsies. All thoracenteses are performed by CSIR.

Official Reading: Refer to "Goals/Expectations for Residents on Chest Rotation"

1) Hansell DM, Armstrong P, Lynch DA, McAdams HP. Imaging of Diseases of the Chest. 4thed. Elsevier Mosby 2005. Chapters 1 thru 5; 7, 14. Available via Countway or to borrow hardcopy from the Chest Division.

   Very dense, but very good if you like to read text books, great pictures See Goals & Expectations document in Dropbox for chapter assignments by year
2) Many journal articles also suggested and listed in the "Goals/Expectations for Residents on Chest Rotation" document

Resident Recommended Reading:

1) www.radiologyassistant.nl

   Read the CXR sections before starting – great anatomy and patterns. Read the HRCT sections before starting CT, hugely helpful
2) Goodman, Felson's Principles of Chest Roentgenology. Quick read, best if done prior to starting.

Review Reading:

1) Core Radiology by Jake Mandell
2) RADprimer questions are good, especially the intermediate level ones
3) Reed, Chest Radiology Plain Film Patterns and Differential Diagnoses

OSCE: OSCE sent to you during your last week to complete at home (usually a RedCap survey - if so, you cannot "go back" to answers, it will delete your test). Then you will review your submitted answers with an attending. Be VERY comfortable with anatomy on lateral view radiographs. Be VERY familiar with the pulmonary segments and segmental pulmonary artery anatomy.

Advice:

1) Read the "Goals/Expectations for Residents on Chest Rotation" document before starting.
2) As you get to the 3rd and 4th weeks of your first rotation feel free to picking up more inpatient chest CTs and a higher volume of chest radiographs.

Notes: Fridge and microwave in the office. (Also candy!)

Coordinator: Laura Freeman

Contact: Mark Hammer, M.D. For scheduling-related issues, also include Andetta (Andi) Hunsaker, M.D.

CSIR

Location: L1; CSIR occupies the first section of the abdomen reading room
Hours: Monday-Friday, 6:30-7:00am to 5:30-6:30pm, but it is variable depending on cases
Conference: Occasionally go to Tuesday 7:30am CSIR conference if schedule permits

Typical day:

- Snapboard: BWH IMG IR CSIR Exams
- 6:45-7:30am: Pre-round
    - Prepare for CSIR rounds by reviewing cases scheduled for the day and using the 'Label' tool in Visage to mark the day's studies (A fellow can show you how to do this on day 1).
    - Cases will have been protocolled already by attending and PA. Review protocol. Make note of the clinical history, indications for procedure, lab results, imaging findings, allergies, and any other pertinent preprocedural information for each patient scheduled or requested (divide list among trainees).
    - Consent all outpatients who have arrived and are marked as ready for consent in the CSIR recovery room before rounds, especially those scheduled for first cases.
- 7:30am: Rounds
    - Led by attending radiologist (who will bring up relevant imaging from his/her workstation), and attended by trainees, PAs, and charge nurse in recovery area
    - Trainee (either fellow or resident) presents the HPI, procedure type and approach (CT vs. US), plan for specimen (on-site cytopathology, histopathology, research), allergies, other relevant info may include recent blood cultures, history of prior paracentesis (know how much fluid was removed), etc.
- 8am: Start of first cases
- Throughout the day – participate in cases and complete documentation (including consent, Pre-Sedation evaluation, Brief Op Note, Post Orders, Pt Instructions, inpatient pass off (if applicable), PowerScribe report, and REDCap entry) (refer to "CSIR Procedure Tip Sheet with Checklist" and "CSIR Manual" on the AII SharePoint website)

Responsibilities:

- Consent all inpatients the day prior to the scheduled procedure when possible (usually completed by the PAs). Consent all outpatients as soon as they arrive to the recovery room.
- Pre-Procedure Checklist:
    - Pre-Sedation evaluation (use IVCS for most all procedures except for thoracenteses, paracentesis, superficial biopsies (local lidocaine only)).
        - Carefully assess the patient for IVCS v. MAC, etc.
            - Airway issues (e.g. ability to lie flat, sleep apnea, very obese, etc.)
            - Ability to cooperate (combative?, confused?)
            - Currently on high doses of narcotics?
            - Anticoagulants?
            - Severe cardiovascular disease?
            - ICU patient? Intubated? Stable?
            - Communicate these issues to the CSIR attending & charge nurse ASAP
    - Pre-Procedure orders: ensure any pre-op orders (IV access, PRN anxiolytic, Port access, any needed labs) are put in before the patient leaves the pre-op bay. For drainages of any kind, make sure the primary team puts in desired fluid studies/orders as "Signed and Held" (e.g. culture, cytology).
    - Safety pause (aka "Timeout"): Nurses will often do this with you and the attending.

- Post-Procedure Checklist:
    - Brief Op Note: Complete the post-procedure brief op note in Epic immediately after each procedure.
    - Post-Procedure orders: Post-procedure orders must be entered on ALL patients in EPIC immediately after the procedure. Use CSIR post-procedure order sets. Have PAs share the order sets with you on your first day.
    - Enter Patient Instructions under "Healthwise Pt Instructions" (use CSIR SmartPhrase) (outpatient only)
    - Inpatient pass off: Immediately following any CSIR procedure on an inpatient, call the resident/fellow/PA of the referring service to give a verbal check-out. This hand-off must be done and documented (in PowerScribe dictation) for each and every CSIR inpatient procedure. Document the verbal check-out in your Powerscribe dictation without exception. Please do not submit diet order for inpatients.
    - PowerScribe report: dictate all cases you are involved in. Try to do this as soon as possible after a case. At the end of the case, jot down the type of equipment/devices used (can save equipment packaging if needed), amounts of medications administered, duration of procedure, etc. so you don't forget.
    - REDCap: Always enter every CSIR case you participate in into the REDCap CSIR QA Database the same day that you did the procedure. It is pretty straightforward and a fellow can show you on day 1. Have PAs grant you access on your first day.
    - For US guided-cases: Be sure to hit "End Exam" on the ultrasound machine before you leave the room. This will push the exam to the relay. You may need to gently remind the techs to send images from the relay periodically in order to dictate these.
- The PAs are outstanding resources and will help you a lot. The PA will carry the CSIR pager (#14520) weekdays, during routine work hours (8:00a - 5:00p). They keep track of all inpatients and round on them daily. They will also work up the new consults. You can and should try to assist with both of these tasks as you are able (particularly, you should try to round on your own inpatients, time permitting).
- Read all abscessograms and all CT abdomen/pelvis with CSIR drainage catheters in place

Call: None. (Fellows will alternate call)

Reading: Limited time for reading during this rotation; consider RadCases and the abdominal imaging books.

OSCE: None

Advice:

1. Wear scrubs.
2. Contact upper year resident/fellow prior to your first day.
3. On the first day have an upper year resident/fellow explain where to sit, how to consent, how to access the procedure schedule, etc.
4. Read the AII SharePoint site thoroughly. It is emailed out to you by the coordinator the week prior to your start date. It contains a lot of information you need to know and it changes frequently. Review the anticoagulation guidelines as well.
5. Remember to have your radiation badge on <u>outside</u> your lead for CT/CT fluoro procedures.
6. There should be 1-2 pairs of lead glasses in the cabinet near the head tech's computer. Would recommend wearing them on the CT-fluoro procedures and the plastic eye shield for US-guided procedures. Accidents do happen.

7. This is a great rotation. You can get a lot of hands-on experience and independence as you feel comfortable but there is no pressure at all to be a procedural superstar. You will always have attending support and don't hesitate to ask for help as needed.

Coordinator: Alisa Greer
Contact: Krista Suarez-Weiss,, M.D.

Cardiovascular (CV)

See the CV SharePoint website for additional information:
https://partnershealthcare.sharepoint.com/sites/bwhNoninvasiveCVImagingEdu/vascular
(VPN/Partners login required)
Link to the protocol video:
https://www.dropbox.com/s/5u4mozfvg94lkzo/CV%20Worklist%20and%20Protocolling.mp4?dl=0

Location: L2 in Shapiro within the CT/Nuclear imaging area. Can be hard to find. Can follow signs for MRI/CV reading room. (Same room as CV Nucs)
Video map to reading room:
https://www.dropbox.com/s/ltw5ld8ixk9lgci/map%20to%20CV%20reading%20room.mp4?dl=0

Hours: Monday-Friday, 8:30am – 5pm

Conference: TBD, usually Thursday mornings 9-10am. It's good to present, so add a few interesting cases to the conference list in Visage (ask the fellow to show you how to add cases.)

Typical day:

1. First day is mostly spent learning how to protocol (Mike or one of the fellows will review them all with you on your first day. Watch the videos on 3D processing in Vitrea until then – it's VERY IMPORTANT to ask the fellow whenever you are unsure about how to protocol a study). You will also need to learn how to use Vitrea (3-D post-processing software to do all the measures of aortic diameters) – take notes because you will forget! It's ok to run by protocols with the fellows at first since there are many nuances regarding phases and timing.
2. Occasionally there are "leftover" studies from day before/overnight, but these have usually been prelimed by the fellow and so he/she will generally dictate them. Studies start to trickle in around 9-10am so you will probably do one to three studies before noon conference. Afternoons tend to be busy with studies.
3. EPIC tech work list for Vascular: BWH/BWF IMG CT/MR Vascular
4. EPIC protocol list for Vascular: BWH/BWFH Vascular CT, BWH/BWFH Vascular MRI
5. EPIC tech work list for Cardiac: BWH/BWF IMG CT Cardiac, BWH/BWF IMG MR Cardiac, BWH/BWF IMG CT Cardiac, BWH/BWF IMG MR Cardiac: BWH/BWF IMG CT Cardiac, BWH/BWF IMG MR Cardiac

Responsibilities:

1. Reading studies
2. Read CT & MR vascular (even if you are a first year). Cardiac imaging is part of a separate 2nd-year rotation.
3. Do not read Neuro/head & neck cases (neuro will read those even if on CV list)
4. Do not read PE studies (chest will read those even if on CV list)
5. Protocol both CT/MR (ALWAYS ask questions if you are unsure. Also refer to prior scans/indication to make sure you protocol correctly.)
6. RARELY HAPPENS: When asked by the tech, administer Lasix for CT urograms (you do not read them, but you are the closest radiologist so inject even though abdomen will read the study). The fellow will show you the first time. You get the Lasix/furosemide from the Omnicell utilizing your Partners username and password. Check with patient regarding allergies and explain why you are administering the medication before pushing. Each vial comes with 2 mL of 10mg/mL. Draw up 1 mL, inject and flush with saline.

OSCE: Mike goes through about 50 cases with you. This takes a long time and usually occurs in the last week of your rotation.

"Final Project" (has not happened during COVID): Each first-year must prepare a final presentation (10 min) based on an interesting case or topic. Discuss your topic with Mike before you start working on it because he may already have something in mind or want you to pick a different topic (if something similar was done recently). Fellows can also help you find an interesting case, help with Vitrea, etc.

Reading:

1. Core Radiology by Jake Mandell (chapters on CV and IR are helpful)
2. Circulation 2010 Guidelines on Thoracic Aortic Disease (Mike Steigner recommends that you read this)
3. NASCI.org → education tab → residents/fellow curriculum has a ton of articles
4. Sharepoint/Mendeley; Mike puts a lot of articles up there and expects you to read them during the rotation. SharePoint has links to tutorials on how to use Vitrea for special reconstructions (e.g. TAVR, DIEP).
5. Nice article on MRI in general with attention to CV: Ridgway, John P. Cardiovascular magnetic resonance physics for clinicians: Part I. Journal of Cardiovascular Magnetic Resonance, 2010.

Advice:

1. Watch Mike's videos on youtube, especially the acute aorta cases.
2. Spend some time at the MRI scanner. The techs are really nice and very knowledgeable.
3. Go to the CT scanner with the fellow if images need to be adjusted (change R-R interval, etc)
4. Ask the fellows a lot of questions – they can be very helpful, especially with learning Vitrea, learning how to measure in double oblique, reading MRIs as a first year, etc.
5. Check out the VITREA videos by Mike. Really learning vitrea and how to do TAVRs and DIEPs will really help with the workload and also impress the attendings.
6. Learn Visage well. Ask about the the Vascular CT hanging protocols, the keyboard shortcuts for series/subseries. Master MPR and how to view vessels in short axis.

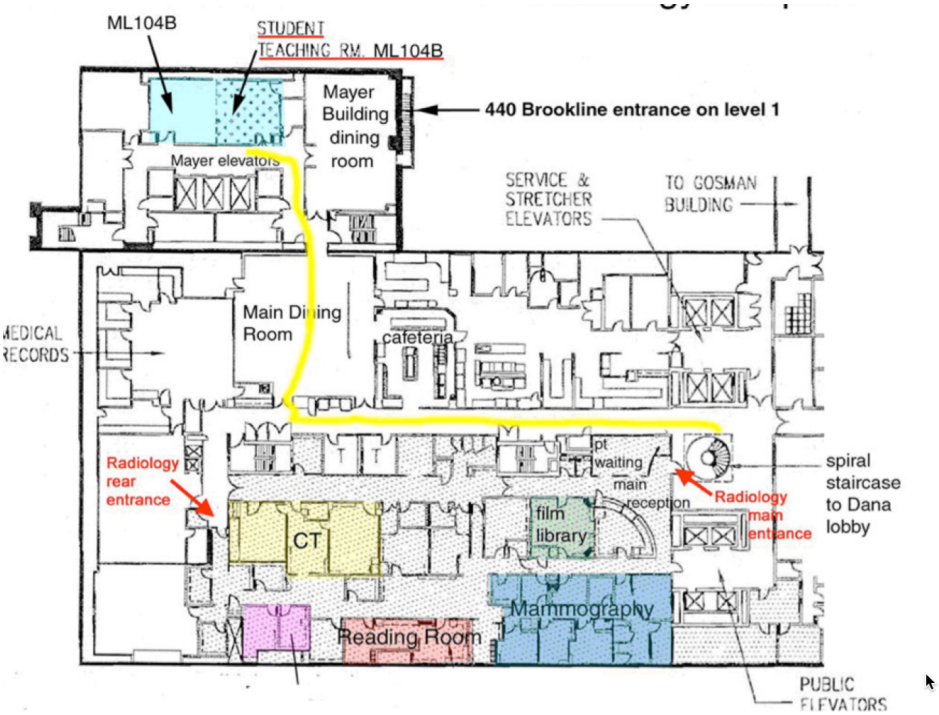
Miscellaneous: Fridge, hot/cold water machine, microwave available close by (have fellow show you where). Staff Bathroom is around the corner near the CT scanners, ask fellow to show you the back way.

Contact: Mike Steigner, M.D.

Cancer Imaging - DFCI

Location: Dana Building, L1. There are several ways to get there. You can enter the Dana Building directly through its lobby and take the spiral stairs down to L1 (mapped here). Alternatively, you can get there via the bridge from BWH (3rd floor at 75 Francis St. entrance, follow the signs to DFCI). The reading room is the room containing the text "Radiology Rear Entrance" below.

Hours: Monday-Friday, 8:30am – 5:00pm



Conference:

- There is usually a daily conference at 10 am that residents and fellows attend. You will receive an email with these every week.
- Attend the abdomen division's case conference at 3:30 PM

Typical day:

1) You will need a DFCI ID to get into the reading room (BWH residents share a single DFCI ID. The resident on service before you will leave it somewhere accessible or you can email Ashley Watterson if you cannot find the badge). You can also get into the reading room from the general Imaging Center entrance (for the public). Just ask the receptionist or a tech where the reading room is.
2) The DFCI and BWH radiologists have recently merged so by the time you arrive some of the below workflow may be out of date.
3) Generally, you will be assigned to one attending in AM and a different attending in PM . Depending on which attending you have determines if you are reading chest studies or abdomen studies. You will receive an email before you start that states which attendings you are working with. If not, someone will tell you when you arrive.
4) The fellows handle most of the phone calls and protocols. There's also an assistant who arrives a bit later in the day who then handles all the phone calls.

Responsibilities:
1) Read lots of CTs (Chest, Abdomen, Pelvis)
2) The fellows generally read the MRIs and ultrasounds

Official Reading: None

Resident Recommended Reading: Oncology folder in BWH Resident Dropbox and section on http://stage.radcommons.org/residents has several interesting articles on side effects of radiation, common drug toxicities, discussion of oncologic emergencies, etc. Highly recommended! Otherwise, this is a good time to continue reading from your standard Chest and Abdomen CT rotations.

Review Reading:
Core Radiology by Jake Mandell (GI/GU sections) and RadPrimer questions. Again, this is a good time to continue your general Chest/GI/GU studying.

OSCE: None

Advice:
1) This is a relatively relaxed atmosphere where you will find a "rhythm," read studies fairly quickly, and keep humming along. Many have likened it to the "Private Practice" rotation in terms of volume and workflow.
2) You may not know a lot about the rare cancers or cutting edge chemo/immunotherapy ubiquitous at DFCI when you start but you will osmose a ton!
3) Candy and water station (and sometimes tea) on the table as soon as you walk in the reading room.

Call: None

Contact: Lauren Kim, M.D.

Emergency Radiology (ED)

Location: First floor of 75 Francis Street. The reading room is inside the Emergency Room. However, due to COVID and ED construction, residents are still reading remotely in the offices one floor below Mellins (listed below). This may change later in the year. Email Ethel Marolda to ask for badge access to the ED.

- Resident 1 & 2 - MSK office
- F1/F2 - Tatiana's office and Bharti's office

Hours: Rotation starts on a Sunday and ends on Friday. You will also have additional ED Saturday shifts (about 7 shifts) spread between first and second year.

Monday - Friday: 1:30pm - 10:30pm
Saturday, Sunday: 12:30pm - 10:30pm

The Emergency Radiology schedule can be seen on Amion with password "bwh erad".

Conference: You are still expected to attend noon conference every day while on the ED rotation. There are also daily ED specific conferences and biweekly ED Quality Assurance conferences on Teams (every other Friday from 1-2 PM), which you are expected to attend.

Typical day:
GOOGLE DOC SIGN IN/SIGN OUT: Everybody working in the ER is required to update a google doc at the beginning of the shift with your location, phone number (landline and cell phone), and attending you are working with, and also remove your name at the end of your shift. We're using this to give our secretaries and techs accurate information about how to reach us at all times! You can find your attending location/number in this list. Google doc
link: https://docs.google.com/document/d/1LmPeIrDONrKZsM2g8nHWH7eWilfJInq1u8kO86XY-hg/edit?usp=sharing

1. EPIC snapboard: BWH IMG ED
2. EPIC protocol list: BWH ED + BWFH Night CT/MR
3. Primordial worklist: BH ED – All Unread (this includes sublists for urgent cares, Faulkner, NWH, CDH, etc), BH ED - NWH ED Unread, CDH Inpt/ED Unread

Responsibilities:

1. Read plain films, CT, US
2. Protocol all CT studies and approve all US studies.
3. For pelvic US, you are required to go in with the tech for all rule-out ectopic studies, NOT FOR EVERY PELVIC US. (Pro-tip: make sure a beta-hCG quant has been ordered when you initial the study because you need the value to interpret a rule-out ectopic).
4. Show attendings all US cases before signing off on them and before the tech brings the patient back to the room in case the attending wants more images.
5. Answer all phone calls.
6. Normal workflow includes monitoring trauma panscans, stroke CTAs, and dissection studies at the scanner (an attending or fellow will do the first few with you). However, while we are reading remotely, the tech will call you and have you pull up a study and clear it over the phone. Stroke CTAs require an ANCR to the team immediately (even if they're standing next to you if you are by the scanner), even if negative. This is needed for institutional stroke tracking metrics.

7. Give prelim reads on all studies to all residents/attendings/PAs. As a first year on your first rotation, refrain from giving prelim reads until you have read out with the attending.
8. ANCR all critical findings on routine studies as well as all findings on STAT studies as soon as you see them and communicate them with the ED team. All positive findings are Orange ANCRs in the ED—do not use yellow ANCR. All negative findings for a STAT study are green ANCRs.
9. Read out with attendings remotely via teams or phone. If you are a R2 or greater, attendings may sign off on many of your studies without reading out.

Official Reading: None

Resident Recommended Reading: You will already have the fundamentals of what you need to know for the rotation since you will have done your core rotations (Neuro US, Chest, MSK, and Abdomen) before starting ED. However you should review head and MSK trauma before starting since you won't see much prior to the ED rotation. "Radiology teaching files one night in the ED" iOS app is also a good app for review of basic bread and butter stuff that you might not actually see during your abdomen rotation such as appendicitis, diverticulitis, etc. Schultz "The Language of Fractures" is good for trauma.

Review Reading: None

OSCE: First year and 2nd year before NF. Twenty cases in PPT with either Sandra or Tatiana – they usually do it in person/on Teams but sometimes have you do it on your own first and then just review the answers, sometime during your last week.

Advice:
1. ED is a busy rotation. Chances are you will not have much time to read outside of work. If you have the time, it is helpful to read about trauma, particularly spine, maxillofacial fracture, ankle fractures.
2. Don't be afraid to ask the clinicians to come back/call back/you will call them back with results when you are ready.
3. DON'T RUSH to read a scan with someone sitting over your shoulders, take your time or you will miss things.

Monitoring a Trauma Scan / Code Stroke – general principles:

<u>ED Trauma Pan Scan</u>
- Official pan scan includes: noncon head CT/ c-spine, then CTA of chest, abdomen *to level of iliac crests*, then CT A/P in portal venous phase
- Always get T and L spine reconstruction
    - techs know to do this but may have to ask ED team to place these orders
    - these images are reconstructed from CAP and do not take extra time or require additional scans
- Monitor noncontrast head CT/c-spine for fx
    - if fx, proceed to neck CTA
- Monitor PV abdomen/pelvis (for bladder/collecting system injury etc) to see if you want delayed (ie 3-5 min) scan of pelvis
    - If obvious bladder rupture, other option is cystogram
        - do CTA C-A-P, then do regular A/P portal venous phase, then clinical team will fill bladder via Foley with contrast and then scan again
    - Other situations for delayed imaging:

        - liver lac, splenic lac looking for pseudoaneurysm
        - stranding around kidney
    - If in doubt re: whether or not to get delayed imaging, just get it (keeping radiation dose in mind)
- Typically before pan scan, portable CXR and pelvic XR's are done
    - if worried about pelvic fx as seen on portable pelvic XR, then extend initial CTA down to level of pubic symphysis / bladder to evaluate for vascular extravasation etc

<u>ED Stroke Protocol</u>

- If concern for stroke, ED stroke activated
    - Attending gets a page
    - Someone from neurology is there
- Patient brought over, scan non-con head CT first
    - You are called to monitor the case
    - Tell them if obvious infarct or hemorrhage
    - SEND 1st ANCR
        - Time-sensitive
- Techs will proceed with CT Angio
    - Only thing you are responsible for is large vessel occlusion
        - they want basic information to determine whether patient needs to go to IR
    - Send second ANCR (usually to same team)
- 2 ANCRs total sent
    - first one sent for noncon
    - second one for CTA
- Most of the time they're there to get results, but sometimes they are not, so you might have to tell the findings to nurse or whoever is there and then sort it out when you are back at work station (but usually someone from neuro or ER will be there)

Miscellaneous: ED is one of the best rotations as a first year because everything seems to come together and finally clicks and you will start feeling more confident in your ability to make a diagnosis and be useful to the clinicians. Shifts without fellows can be VERY difficult and you must learn to read studies at a MUCH faster pace than earlier in the year.

Contact: Tatiana Rocha, M.D.

Fluoroscopy

Location: L1 near Amory elevators. Next to ultrasound.
Hours: Monday-Friday, 8:30am – 5pm
Conference: Abdomen 3:30pm interesting case conference

Typical day:

1. EPIC Snapboard: BWH IMG FL GI
2. During the first day you will shadow and learn how to perform the different exams as well as how to use the equipment.
3. By the end of the week you will be performing exams more independently.
4. Throughout the day you will be performing various exams such as upper GI series, esophagrams, barium enemas, HSGs, etc. You will also be asked to help with speech and swallow fluoroscopic video swallow studies with the speech pathologists
5. In between Fluoro you should read KUBs and you will sometimes be asked to pick up a CT Abdomen/Pelvis depending on the list).
6. It's helpful to stay after the last case and read up on the scheduled cases for the next day (clinical indication, prior surgery, prior imaging studies, etc.). You will need to send out an email to the attending and the tech (Randall) that night summarizing the cases for the next day.

Responsibilities:

1. Perform and dictate the Fluoro studies and KUBs.
2. Answer phone calls and review requested cases with the attending.
3. You may get called/paged for intraoperative x-rays for missing needles or sponges. For obvious reasons, you will need to call the OR asap with an interpretation. If you are unsure, ask your attending for help on these (they will want to be notified).
4. There may be a "rad to do" in the afternoon, which is an HSG where the radiologist places the catheter through the cervix via pelvic speculum exam. You will be shown how to do the first one.

Official Reading:

1. "Educational Guidelines for GI and GU Fluoroscopy", a comprehensive guide by Dr. Alencar et al. available on http://stage.radcommons.org/residents containing all of the essential info you need.
2. Braver, Essentials of Gastrointestinal Radiology. The classic text by our beloved former fluoro director, Dr. Braver.
3. Mayo Clinic, Gastrointestinal Imaging Review

Resident Recommended Reading:

1. Start with the powerpoint attached to the welcome email sent to you by Dr. Alan Cubre, who is the section attending liaison. It is incredibly helpful. You should review this before you start and consider reviewing again after your first day as it will make more sense after seeing some studies.
2. UVA Introduction to GI Radiology website: https://www.med-ed.virginia.edu/courses/rad/gi/index.html
3. "Swallowing disorders" section of radiologyassistant.nl. This is a nice intro to Speech and Swallow studies which you will do very frequently and we don't typically learn about these elsewhere.
4. "Esophagus" subsection of the "Chest" section of radiologyassistant.nl.
5. Fluoro is a very surgical-based field of radiology and you will talk a lot with surgery residents and attendings. This is a good rotation to become familiar with basic GI and GU postoperative anatomy, surgical indications, and common procedures (bariatric, colorectal resections, esophagectomies)

because you will need to know what is expected (and unexpected) fluoroscopically. Try Googling diagrams of the surgeries your patients have undergone as part of the pre-procedure workup.

Review Reading: None

Advice:

1. Learn the machines first. There are three machines, two tilt-table and one C-arm. Not a bad idea to pop over if you have a free half hour in the week leading up so that someone can show you the machines very quickly. Makes a huge difference on the first day. Otherwise, you will quickly pick it up in the first couple of days.
2. Fluoro is best learned via the "see one, do one, teach one" approach. It is normal to feel uncertain about your technique for the first couple of weeks but eventually it will start to make sense (I promise!). Randall Czajkowski, the Radiologist Assistant, is absolutely your best resource and will show you the ropes on your first couple of days. Don't be afraid to jump in and try, especially when he is in the room with you.
3. The mornings are typically quite busy, but the afternoons are generally lighter and a good time to catch up on non-emergent KUBs, dictations, and starting to look at the next day's cases etc.
4. For feeding tube placement ("Dobhoffs"), you will need to assess the indication for a fluoroscopy guided placement. Typically, the floor team will have to make several good faith attempts at placement on the floor before we will accept the case (though there are many exceptions). In general, if the team does not want to insert the feeding tube blindly because of the risk to the patient (radiation changes, recent surgery), they need to understand that in fluoro we use the same blind approach. The only difference is that the confirmation of the placement can be done faster. In those cases, consider endoscopic feeding tube placement (done by GI or ENT).
5. Hysterosalpingograms performed by gynecology require you to be immediately available for imaging. Try to anticipate when these will happen so you'll be free and patient discomfort can be minimized.
6. For Speech & Swallow Video studies, the Speech Pathologist will interpret the study but you will also do a dictation. Make sure you ask them the prelim results before they leave with a pen and paper on hand so your report matches their findings. Alternatively, get the Speech Pathologist's pager and touch base with them before you sign your report.
7. For all studies, have a good sense of what you are looking for and what you expect to see before going in the room. While many studies have a standard protocol, a decent number of studies will require you to manipulate the patient and/or the machine to get the right view.

OSCE: None (cases are included in the final Abdominal OSCE)

Miscellaneous: Wear scrubs!! Fridge, microwave, water cooler in the lounge.

Contact: Alan Cubre, M.D.

Mammography

Location: Lee Bell Center, 2nd Floor Pike OR DFCI

Hours: Monday-Friday, 8:30am – 5pm or until 6pm if assigned as the late person (approximately once a week)

Conference: TBD

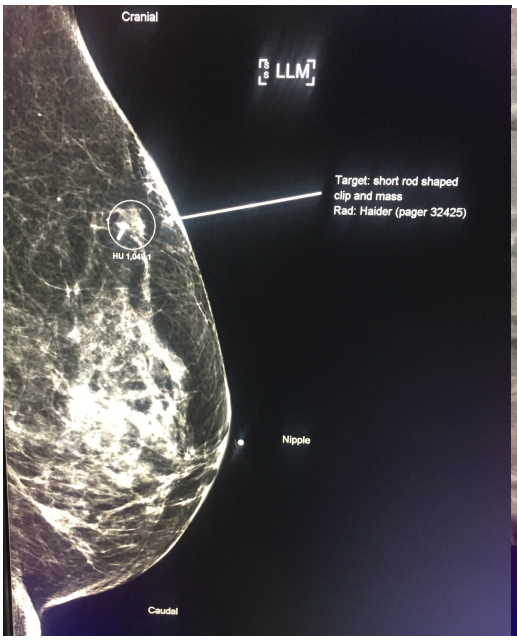
Typical day:

1) As a first year you are assigned to Lee Bell, DFCI, or biopsies. The assignment will be emailed to you by the section liaison in advance.
2) EPIC Snapboard for procedures: BWH IMG LB IR BI.
3) EPIC Snapboard for MRI breast: BWH LEE BELL MRI 3T
4) EPIC protocol list (for MRI breast only): BWH Breast MRI
5) The login for Hologic stations is ID: mammo, pw: mammo. Then click "Administration" to view the list of stored patient images. When you go to conference or finish for the day, exit out of the Hologic application but DON'T log out or shutdown the computer.
6) Lee Bell Workflow: Techs will bring in charts and put them in the bin → you grab one → look up study on Hologic station via Visage → review patient questionnaire and perform brief chart review (prior breast cancer, surgery, imaging) → review images → review images with attending and determine next step(s) (additional views, US, etc) → if OK to go then fill out results sheet for patient and either give it to tech or deliver to patient directly → dictate
7) DFCI Workflow: The tech will place the new case folders in a stand in the reading room. You will work these up similar to diagnostic cases at Lee Bell. Since these are often women with history of breast cancer, every case is treated as diagnostic and the patient is given a copy of the report after the study.
    a) Follow instructions as in the DFCI section of this guide (the mammography room is next to the DFCI reading room).
8) If a biopsy is recommended you will need to email the biopsy coordinator (BWH Mammo Bx and Deborah Malone) including the patient's name, MRN, biopsy type, CC ordering physician and your attending. You will also need to send an ANCR as well.

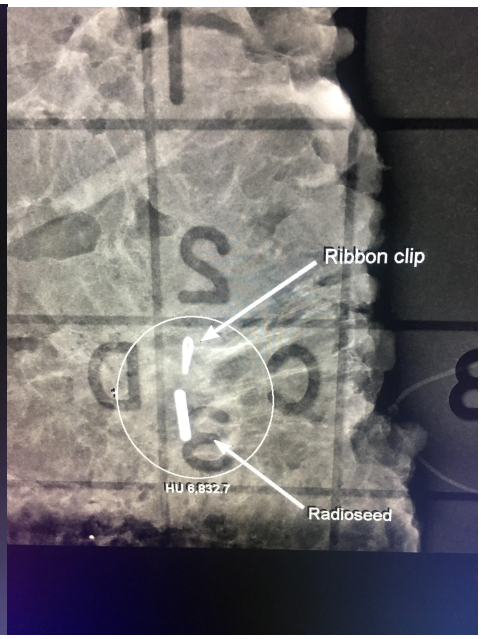
Hologic Workpad

PACS Annotations
After Seed Localization: Annotate the final images (ML and CC views) for surgical planning. Needs the following labels: Target (seed/clip/mass/calcifications), cranial/lateral/medial/nipple, circle the target, add attending's name.
Specimen Labeling: After the lumpectomy, the specimen is imaged and those need to be labeled as well to make sure the target was resected.

Seed Loc Annotation



Specimen Annotation



Screening: (Not for first years). You review all of the screening images in the "screening reading room." When you arrive, ask one of the admins or techs for a list of all of the screening mammos to be read. Check in with attending for the day about workflow (some variation). Most attendings will not want you to dictate. Review screening exams on list and mark down on the list which ones you think need to return for diagnostic images, or on which you have questions. Review the screening list and exams with the attending. Have the attending sign the first page of the list. Save this list for your records.

YAWKEY 9: (Not for first years). You will be scheduled at Y9 in the morning for a few days of the rotation. Enter Yawkey building from Brookline Ave and take the elevators to the 9th floor and at the front desk ask for instructions to the reading room (you can also get to Yawkey building following instructions on the bridge from BWH to DFCI). This is a consult service and in the reading room you will find a stack of cases (paper printouts with outside hospital reports) scheduled to be seen that day. The patients come in with their images and so these will get uploaded slightly prior to their appointment. You will review all the images and the outside reports, present to the attending, and decide if additional work up is necessary. The attending will generally discuss this with the clinical team in person when they come in to the reading room. Dictate the cases using the consult template.

Responsibilities:

1) As described above.
2) Refer to "Brigham and Women's Hospital Breast Imaging Division: Resident Education," which the resident liaison will/should send to you ahead of time

Official Reading:

1) ACR BI-RADS Atlas 5th Edition
2) Refer to curriculum in "Brigham and Women's Hospital Breast Imaging Division: Resident Education"

Resident Recommended Reading:

1) Core Radiology by Jake Mandell (make sure to use the updated Breast chapter labeled "Updated for BIRADS 5th ed").
2) Review ACR Appropriateness Criteria for Breast Imaging, can be found online in the ACR website.
3) Locked cabinet "mammo library" in the reading room contains many reference textbooks, ask the lead tech for the key. You can borrow these books, make sure to write your name in the sign out folder in the cabinet. See what books have other residents borrowed in the past and try reading those! I recommend just looking at the images and figures.

Review Reading: RADPrimer articles and questions are good for reviewing.

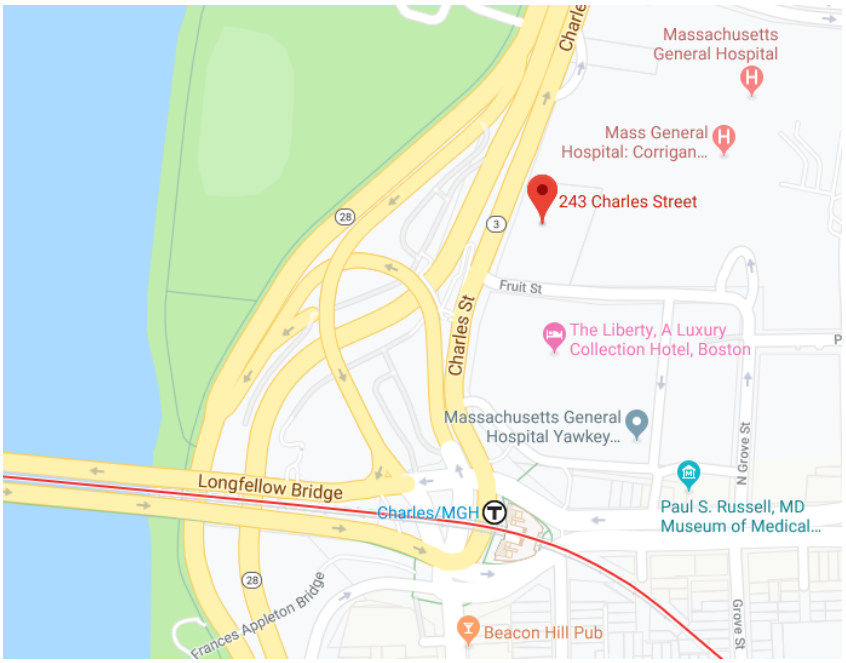
OSCE: You will be given a PowerPoint with approximately 51 questions and cases during the last week. This is graded like an exam; the passing threshold is 65%. Be sure to email the resident liaison on the last Monday of your rotation to be sure they remember and schedule it with you.

Miscellaneous: Wear your white coat. If you are assigned to be the late person (5-6pm), you need to make sure that all of the localization specimens have been properly labeled and dictated. Also, you are the emergency contact in the case of an after-hours MRI contrast reaction in the breast section. You are also covering any emergency calls to rule out breast abscess. There is always an attending on late call as well. Make sure you leave your pager number with the MRI techs if the day's work is done before 6pm (you are covering contrast reactions so you CANNOT leave until there are no more MRI scans). You can also just check with the techs at the end of the day to see if there are any more MRIs planned with contrast. If not, you can go!

Contact: Jihee Choe, M.D.

Mass Eye and Ear (MEEI)

Location



Massachusetts Eye and Ear Infirmary 243 Charles St Boston, MA 02114

The administrative assistant, Nadia Allen, will include detailed instructions in her welcome email. Just in case, the MEEI is located a block away from the Charles/MGH Red Line station. As soon as you walk into the main lobby you will see a prominent "Radiology" sign next to the "Emergency" sign. Radiology is to the right as you enter. Follow the sign past the emergency department. Ask for Nadia Allen at the radiology front desk.

Hours

Regular hours are 8:00am to about 4:30pm. No weekends or holidays.
Each day, there is an early trainee and a late trainee. You and the other residents/fellows will divide early/late coverage among yourselves. The total number of trainees is highly variable, ranging from you being the only one to 5 or more.

- Early: 7:30am to 4:00pm. You are there for IV contrast coverage until 8:00. No need to pick up studies until 8:00am.
- Late: 9:30am to 6:00pm. You are there for IV contrast coverage as well as to give preliminary interpretations on any STAT postoperative radiographs (usually line placement). You are expected to *proactively* call the PACU about those.

Conference

Schedule posted on wall in the reading room. Sometimes there are educational conferences, but most of the time you are free to disappear for an hour-long lunch break.

Typical day and responsibilities

Check in with the day's attending. Some attendings will have all the trainees gather around the big screen and show you cases; dictations will be split among the trainees. Other attendings will have the trainees each pick up studies from the list and read out later as a group.

There are lots of fluoroscopy studies, usually 6 per day. Most are modified barium swallows, infamously known as "videos," done in conjunction with the speech-language pathologists. Usually the trainees take turns doing fluoroscopy cases, so you are not the only one soaking up radiation.

See above for responsibilities of the early and late person.

OSCE: None

Official reading: None

Resident recommended reading

Brushing up on your skull base, neck, and temporal bone anatomy is a must before starting this rotation.

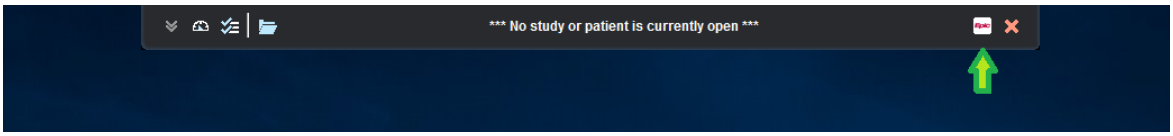
- *Core Radiology*
- *Crack the Core Exam*, Volume 2, by Prometheus Lionhart. By the time you start this rotation you should at least be thinking about getting *Crack the Core*.
- *Neuroradiology: The Requisites* by Nadgir and Yousem, specifically the head and neck sections.
- IMAIOS e-anatomy.
- Resources on the neuro section of the resident website. In particular, look closely at Dr. Curtin's temporal bone anatomy presentation. He says the 5 axial and 5 coronal images in his presentation are all you need to know to get started with the temporal bone.

Notes and Tips:

The first day orientation consists of a tour of the facilities, a trip to the security office to obtain your badge (double check that your name is spelled correctly!), and an hour and half of audiovisual experience in fluoroscopy and MRI safety. Unfortunately, the orientation doesn't include any training on the software that you will be using every day.

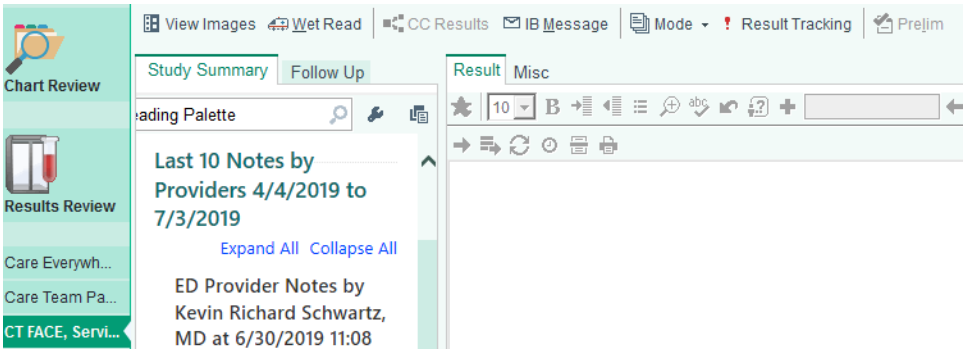
- Log in: Use your Partners user name and password. In most instances, you will need to type PARTNERS\ before your user name (as in *PARTNERS\js256*) to be able to log in. Your Brigham H:\ drive is not available at MEEI.
- Synapse PACS: Remember the PACS from Children's? Yep, it's back. There is no integration whatsoever with Epic or PowerScribe. Many studies are not available in Synapse and can only be viewed in Epic. Until MEEI switches over to Visage eventually, you are stuck with this. Read from the *Unread Studies* work list. Before picking up a study, right-click on the study from the list and choose *Reserve for Me*; that lets other people know you are looking at it.
- PowerScribe: You will need to manually enter the patient's MRN or the study's accession number to start a dictation. MEEI just started using PowerScribe in mid-June, and as of this writing there are *no* structured reporting templates. An IT person or an attending will give you a collection of templates in Microsoft Word format, which you will need to manually copy and paste into PowerScribe for each dictation. Painful. The only redeeming thing is that you are using the same PowerScribe profile as the one you are using at the Brigham, so that your personal autotexts, auto-corrections, and the profile of your beautiful voice are maintained.

- Epic: There is no Epic icon on the desktop or in the Start menu. You need to direct your browser to Citrix Workspace at https://workspace.partners.org to launch Epic. Log in with your Partners user name and password. Use the "MEE IMG Radiologist" context. Sometimes Epic minimizes itself right after launch. Look for a gray bar at the top of the screen and click on the small Epic icon (marked with green arrow in the screen shot below) to bring Epic back.



How to enter a preliminary interpretation in Epic (if you are the late person):

  - Hit Study Review. If it is not a shortcut on your top bar, find it under the top left Epic Menu -> Radiology.
  - Find the study by accession number.
  - Enter pertinent findings/impression under the Results tab on the right.



  - Important: Don't click the Prelim button. Instead, close the patient chart. When a warning pops up, hit the button that says *Save and Don't Claim*.
  - If you accidentally sign or claim the prelim, the study falls off the Synapse work list and risks remaining undictated for days. The following day you should tell the attending about this study so that it gets dictated.
- ANCR: Does not exist.
- Paging: You can't log into the MEEI paging directory. Ask Nadia Allen or call the operator to help you reach someone.

Take the time to learn the fluoroscopy machine, which you will be using daily. In contradistinction to the fluoroscopy machine in the "new" room at the Brigham, on the MEEI machine the thumb button takes a still exposure and the index finger trigger activates continuous fluoroscopy. Usually all fluoroscopy sequences are automatically saved (does not need to press "save cine loop" button), but it never hurts to check with the technologist to make sure you have all the images. Be sure to grab the total fluoroscopy time and dose numbers from the technologist at the end of the study to put them into your dictation.

Aside from the numerous modified barium swallows, the volume of studies is low. The most frequently encountered studies are face/sinus CT, neck CT, neck+chest CT (for restaging), neck MRI, skull base MRI, internal auditory canal MRI, and temporal bone CT. Learn from each case! When dictating a study, take your time and look at the history and any available priors in Epic.

Have your laptop ready when reading out with the attending. You can open PowerScribe through Citrix Workspace and take notes directly in your report draft. Alternatively, create a Word document through your Partners Office 365 account (open https://www.office.com and click Word) and take notes in there. When

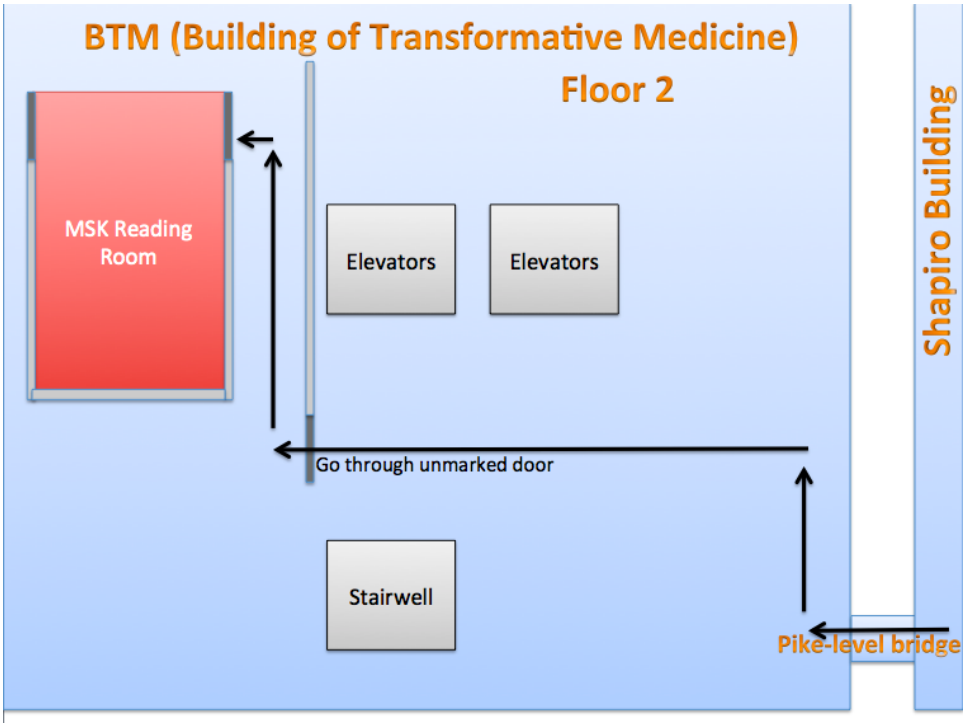
you get back to your reading station, you can open the document via your workstation's Web browser, copy your notes, and paste them into PowerScribe. Because this Word document remains within your Partners Office 365 cloud storage, you don't lose your notes and you avoid saving protected health information into your personal files.

The break room has fridge, microwave, and free Keurig coffee. The cafeteria is located on the 7th floor. The view up there is amazing.

Contact: Nadia Allen (all administrative issues); Mary Beth Cunnane, M.D.

Musculoskeletal Imaging (MSK)

Location: Second floor (Pike level), Hale Building for Transformative Medicine (BTM)



Hours: Monday-Friday, 8:30am – 5pm

Conference:
Interesting Case Conference Monday 1-2pm
Tumor Board Tuesday 7-8am
MSK Fellow Conference Tuesday 8-9am
Subject of the Week Conference Wednesday 1-2pm
Spine conference on the third Friday of the month at 8am

Typical day:
1) EPIC Snapboard for Arthrogram/injections: BWH IMG XRAY MSK IR BTM
2) EPIC Snapboard for Biopsies: BWH IMG IR CSIR (look for MSK cases)
3) EPIC protocol list: BWH/BWFH/FXB/WB MSK CT/MR
4) Read all BWH studies, ask daily if you should read FXB, 850 or Faulkner studies since there may be a separate attending assigned to read those on some days.
5) At the end of the day the attending you are working with will let you know whether you should take more cases or just finalize the ones you have already dictated and go home.
6) You are usually done by 5ish but occasionally if it is busy you might be there till 6pm.

Responsibilities:
1) First years will read plain films only.

2) You need to observe two shoulder and two hip arthrograms. After observing the procedure, ask the tech to show you the book where you need to place the patient's sticker, sign your name, write the name of the attending and the name of the procedure observed.
3) After your first four weeks when you see 2 or more hip and shoulder arthrograms, you will then perform two or more hip and two or more shoulder arthrograms in your next few weeks of MSK rotation (may not happen until your second year).
4) At some point shadow the techs for half a day and learn how patients are positioned and how images are acquired (usually in the first week). Ged will help you find a tech to work with.
5) Choose two cases for the teaching file; Stacy/Ged will discuss this with you in the first week

Official Reading: Arthritis in Black & White by Brower (you'll see a lot of arthritis, but this book is not NEARLY enough to learn MSK by any means, it just skims the surface and you should read much more than this book). Ged may send along additional resources in his introducturo email.

Resident Recommended Reading:
1) Musculoskeletal Imaging: The Requisites
2) Fundamentals of Skeletal Radiology by Helms
    i) same guy from Brandt and Helms so you could also just read the MSK section from B&H
    ii) this is the book most people read, but it's not very good, just a lot of forced memorization, no pathophysiology
3) Musculoskeletal Imaging by Pope: http://id.lib.harvard.edu/aleph/014231193/catalog
    i) This is the all-star book, if you want to really learn MSK at near-fellow-level this is a must read
4) Musculoskeletal MRI by Helms, Kaplan, et al.
    i) Available on Hollis/Countway

Review Reading:
1) Core Radiology by Jake Mandell
2) Anatomy from e-anatomy or freitasrad.net

OSCE: You go over a bunch of cases with Ged (nothing specific you need to do ahead of time).

Advice: It is super useful to bring up a google image of a normal study with anatomy labeled while you read. For example, if you are reading an elbow radiograph, google "elbow xray anatomy."

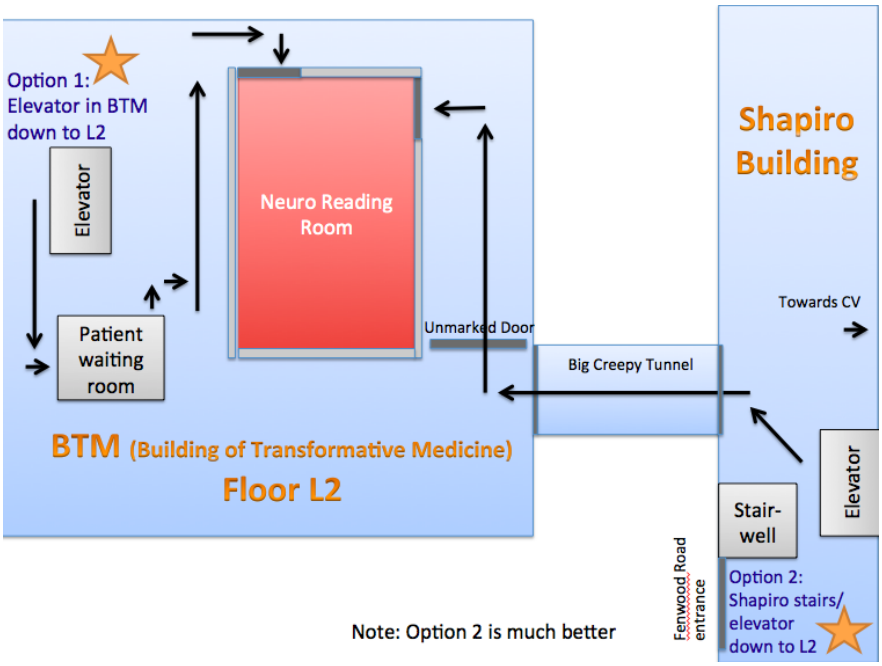
Notes: Fridge under the counter near where the secretary Calvin sits. Water, coffee and tea down the hall in the staff break room, ask an upper year resident to show you. Bathrooms are around the corner by the patient changing area.

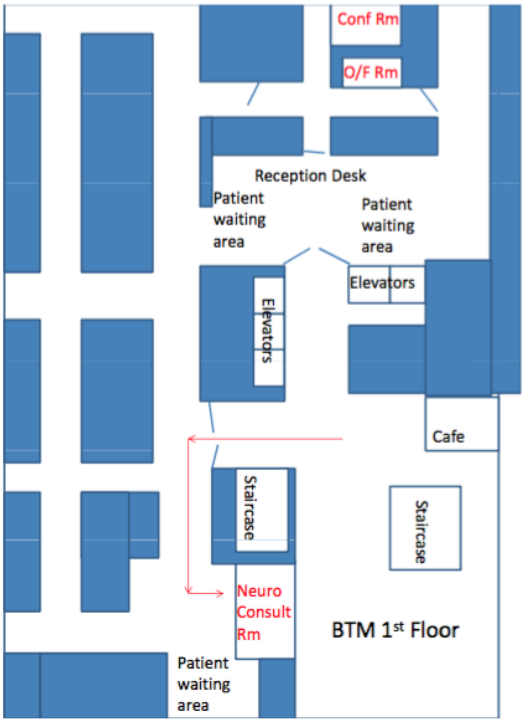
Contact: Ged Wieschhoff, M.D.

Neuroradiology

Location: L2, Hale Building for Transformative Medicine (BTM)

Occasionally a resident may be assigned to the Consult/Overflow rooms on BTM 1st floor. Check the schedule.





Hours: Monday-Friday, 8:30am – 5pm
If covering 221 Longwood, you will need to get there at 7:30am (you will get the schedule beforehand), and must stay until 5 pm when the moonlighting coverage starts, so there is no gap in contrast coverage.

Conference:
Head & Neck conference for fellows and residents (can attend when no AM conference): Tuesdays 7:30am in main Neuro reading room BTM L2
Neurosurgery conference Wednesday 8am in BTM 3rd floor conference room

Typical day:
1. EPIC protocol list: BWH Neuro CT/MR (Today), BWH Neuro CT, BWH Neuro MR
2. When you enter the reading room please consult the assignment list for each resident to determine which attending and reading assignment you have for the day – it is important to read your assigned cases only to ensure uncomplicated workflow
3. Read out with an attending intermittently. Start reading cases when you arrive and the attending will intermittently read you out.
4. The phones ring (a lot) and you are expected to answer – sometimes for protocols, sometimes for prelim reads. If you do not feel comfortable giving prelim reads (especially in the beginning), feel free to ask a fellow or attending. A lot of times you have to transfer the phone call to an attending or fellow anyway because it's regarding an MRI (which you generally don't start reading until week 3 or 4).

Responsibilities:
1. Refer to "Training of radiology residents in Neuroradiology Division Goals, objective and curriculum" document sent to you ahead of time
2. Start reading only non-contrast head CTs and stick to those for the first couple of days to week.
3. As you get comfortable add sinus CTs, neck CTs, and contrast-enhanced head CTs. Consider CTA and spine CT later in 2nd week.
4. You are assigned an attending to read out with. Check Amion to see your resident assigned #. Then refer to the "Neuroradiology workflow distribution" on the wall in the BTM reading room to see what studies you will be reading that day. Resident 1 reads with Attending 1, Resident 2 reads with Attending 2, and Resident 3 reads with Attending 4.
5. Consider starting brain MRI during the third week, just a case or two per day, but ask your attending first.
6. Protocol studies: Most CTs are straightforward (usually non-contrast). Ask a fellow if you have questions. MRs are more complicated so you can defer but it never hurts to try to learn them since you will have to know them eventually! Do NOT protocol an MRI unless you are sure (if you are not sure, always ask).
7. Sometimes you will have to work at 221 Longwood, across from the medical school (just Google it for the address – you basically walk out across the Harvard Quad and to the building). Eileen will email you the weekly schedule in advance. You must arrive by 7:30am. You are there in a room alone to cover for contrast reactions and the attending will usually meet you there to read out or will read out with you over the phone. Make sure to call the techs once you get there or check-in in person so they can start contrast injections (the 2 phone numbers are posted on the wall in the reading room).

INSTRUCTIONS to find the reading room, once you enter 221: Enter 221 longwood. Go to the Right, past security. Walk down the hall. Get to the first open area where you will also see elevators, turn left. There are stairs on the left at the dead end. Go down (or take the elevator down one floor).. The waiting room (reception) for MRI is on

your left down the hallway. Walk past it and go to the back end of the hall. The reading room is at the end of the hall on your left. There is a fridge, microwave, water cooler, and bathroom in the back office area too, which is through a door at the end of the hall requiring you to swipe your badge to get in.

Official Reading:

1. Refer to "Training of radiology residents in Neuroradiology Division Goals, objective and curriculum" document sent to you ahead of time
2. Neuroradiology: The Requisites
3. Brant & Helms Neuro section

Review Reading:

1. Core Radiology by Jake Mandell
2. headneckbrainspine.com is great for anatomy and cases

Resident Recommended Reading: Core Radiology by Jake Mandell

OSCE: OSCE sent to you during your 6th week of the rotation to complete at home. Once you submit your answers, the solutions/explanations will become available. Note: you cannot go back once you have answered a question.

Advice: Don't be afraid to take MRIs/CTAs early, but it depends on the attending. Check with an upper-level or your attending for the day to make sure it's OK.

Miscellaneous:

1. Break room with fridge, hot water, Keurig machine with free coffee and tea. Ask someone to show you where it is.
2. Attending schedule is posted weekly in the reading room.
3. Eileen Walsh is fantastic and will go out of her way to make you feel comfortable and will help you understand the schedule and will help you work out any administrative issues you may have (within reason)

Coordinator: Eileen Walsh

Contact: Ray Huang, M.D., Ph.D.

Nuclear Cardiology

Location: L2 in Shapiro next to the MRI/CT machines. Can be hard to find but just ask any tech to show you. Can follow signs for MRI/CV reading room. (Same room as non-invasive vascular imaging.)

Hours: Monday-Friday, 8:30am – 5pm

Conference: Ask the fellow

Typical day: Mornings are slow - you can look up and protocol the scheduled studies for that day (clinical indication, cardiac history including prior imaging studies and surgery, etc.), read or follow around the cardiology fellows as they provide meds for stress tests, review scans, etc. Typically, the attending does not arrive to read out cases until around 2pm. You, fellows, and attending sit around 2 workstations and attendings will ask you to "take the cases" and will ask you general questions. The fellows prepares/formats the studies and the attendings write the reports.

Responsibilities: No opening studies or dictating studies. You just contribute by interpreting studies as asked and by learning from others taking studies and from the attending teaching. You may want to have looked at CORE radiology's nuclear cardiology section before you start. since you may be asked to contribute on the first day.

Official Reading: Cardiovascular section in Mettler (the "gold standard" nuclear medicine textbook) – very helpful, must read at some point to know the content adequately for boards.

Resident Recommended Reading: "Nuclear cardiology tips" written by one of the fellows (on BWH Dropbox)

Review Reading: Core Radiology by Jake Mandell

OSCE: None.

Advice: It will be helpful to know the basics of cardiac SPECT/PET, particularly the anatomic slices of the heart (short axis, longitudinal/horizontal long axis), as it will orient you to cases on the first day. Know how to describe defects (fixed, reversible, size, severity, etc). Briefly review coronary anatomy.

Contact: None official

Nuclear Medicine

The NM procedure guidelines can be found at: http://bwnmserver2/proc_manual/index.html (via Partners PC)

See the Nuclear Medicine SharePoint website at:
http://sharepoint.partners.org/phs/divisionofnuclearmedicinemolecularimaging/SitePages/Home.aspx
(VPN/Partners login required)

Location: L1 between Amory elevators and Abrams conference room. Look for signs "Nuclear Medicine". Reading room is in the back; can ask admin or any tech to show you where.

Hours: Monday-Friday, 8:30am – 5pm, late person stays previewing the leftover outpatient studies until about 6pm (almost always a senior/fellow unless they are short-staffed). Early morning person (7am) covers the early morning injections (you don't have to take the early morning or late shifts as a 1st year).

Conference (can join after resident AM conference finishes):

- Tuesday Clinical Conference 8-9am (NM conference room)
- Thursday Nuclear Medicine Seminars 8-9am (NM conference room)

Typical day:

1. Morning: Patients are being injected and it takes time before those can be read. Start by reading leftover PET/CTs from the day before. You'll usually read out the morning's cases in a single readout in the late morning, but some attendings will be in the room all day and will read each case as it comes.
2. Afternoon: read more PET/CTs and nuclear medicine studies. All gamma studies should be reviewed with the attending and dictated on the day they are performed/completed. PET/CT studies completed by 4:00 PM should be reviewed with the attending physician and dictated by the end of the day.
3. Try to get exposed to as many of the gamma studies (non-PETs) as possible. Even if you don't pick up the study yourself, it's often helpful to go over them with the senior resident or fellow who is dictating it or to listen in when they are reading out with the attending as this is when the teaching occurs. The gamma studies are also what the bulk of the OSCE is composed of.
4. EPIC Snapboard: BWH IMG NM/PETCT SH, BWF IMG NM/NMC
5. EPIC protocol list for BWH studies: BWH Nuclear Medicine
6. EPIC protocol list for Faulkner studies: BWFH Nuclear Medicine

Responsibilities:

1. Gamma camera studies (e.g., thyroid, bone, HIDA, parathyroid, gastric emptying, V/Q quants, lymphoscintigraphy).
2. PET/CTs (can start reading these right away if you've had chest and abdomen, may wait until 2nd week if you have not yet had these rotations).
3. Inject and/or mark sites for lymphoscintigraphy and draw up/inject CCK and morphine for HIDA. For lymphoscintigraphy injections: if it is a breast with NO imaging, the attending is required to perform the injection. If WITH imaging (breast, melanoma), you can do it. Attending/fellow will show you before you have to do it alone. To be able to draw up morphine, you need to access the Omnicell system (closest is in the CSIR Recovery room). To get setup with access to the Omnicell, email Kwok Chuen Szeto at KSZETO@partners.org.

4. Techs will ask you to take a look at scans to assess for need for SPECT or SPECT/CT. Always ask the fellow or attending.
5. Cardiac sarcoid PET studies are read by two different teams: nuclear cardiologists who read the heart findings and NM reading room reads the rest. Write up the findings in an empty PowerScribe report and email it to the nuclear medicine attending. After the nuclear medicine attending edits your report, they will email that report to the nuclear cardiology attending that day.
6. Thoracic surgery PET/CT cases come in a red folder and should be read ASAP. If these come as a late case, call to find out when patient is coming into clinic and how urgent the results are.
7. Protocols – most are very straightforward. You must document the correct side and pregnancy status in the comments section of the protocol for all breast lymphoscintigraphy cases.
8. You are required to give a ~10 minute presentation on a topic of your choice during your last week. You can check your topic with Matt ahead of time.

Official Reading: Essentials of Nuclear Imaging by Mettler (first two chapters are boring but otherwise this book is excellent--very thorough and very high yield for boards.)

Resident Recommended Reading: University of South Alabama case review

Review Reading: Core Radiology by Jake Mandell

OSCE: Go over around 10/11 cases in a PowerPoint with Matt during the last week of the rotation. Know the tracers for the different NM studies.

Advice:

1. Helpful to have read Chapters 1-2 (radiopharmaceuticals/instrumentation) of Mettler before the 1st day so you have some background knowledge on gamma studies, how they work, etc.
2. On the first day have one of the seniors or fellows go over how to use Hermes with you and how to display the different NM studies for optimal reading. Taking notes is helpful to remember later on as there are many different types of studies.
3. Ask a lot of questions and have the attendings/fellows look at the gamma studies with you. They will probably seem really confusing/foreign at first.
4. If mornings are really slow, ask to follow the techs to see how images are obtained and also spend time in the hot lab if possible. There is a checklist of items you will need to complete before graduating, you should keep it around and have the techs sign off on the items whenever possible.

Miscellaneous:

1. Fridge and Keurig machine across the hall from the reading room. Water cooler in the patient waiting room.
2. Also read Faulkner studies. You'll get the requisitions by email. Faulkner techs call the room when the study's done.
3. Resident/Fellow schedule is emailed out usually 1 month prior to rotation. This email contains lots of useful information so make sure to read it before you start.
4. Attending schedule is tacked to the wall in the reading room.

Contact: Matthew Robertson, M.D.

Pediatrics

Location: Boston Children's Hospital, Main Building, 2nd Floor

Orientation: First day of the rotation will be orientation where you will receive ID, training on PACS and EMR, tour, etc.

BEFORE: You need to make sure you have all your occupational health requirements up to date including tdap and 2 TB tests

Schedule: 3-month rotation during your second year. Residency coordinator will email you for schedule and vacation requests approximately 1-2 months prior to the rotation. You may take up to 5 days off during the rotation without question (if continuous three-month block), 3 days (if two months), 2 days (if one month). Only a total of 5 days are allowed for cumulative three months at BCH.

Hours:

1. Typical rotation: Monday – Friday, 7:30am – 5pm
2. Late shift (aka XR float; 1 week): 10:30am – 7pm
3. Call (separate call pool from BWH): You will receive the call schedule prior to the start of the rotation. You may swap with other residents if necessary.
    a. Night float: Friday – Sunday, 8pm – 8am; Monday – Thursday, 8pm – 8am
    b. Weekend: Saturday – Sunday, 8am – 8pm

Conference: Schedule posted in front of Wittenborg Conference Room.

1. Morning conference: typically Monday – Friday, 7:30am – 8:30am in the Wittenborg Conference Room
2. Noon conference: typically Monday – Friday, 12pm – 1pm
3. After-work conference: 5pm – 6pm on select days (GU conference, trauma conference)
4. Note: must badge into conference to get credit for attending (computer at back of room).

Typical day:

1. You rotate through various subspecialities each week, including ultrasound, fluoroscopy, body, MSK, plus a couple electives, such as neuro, nuclear medicine, IR
2. Similar workflow to BWH
3. Help monitor and protocol studies on Allocade

OSCE: None

Official Reading:

1. Must complete Cleveland Clinic Pediatric Modules for the rotation you are currently on (https://www.cchs.net/onlinelearning/cometvs10/pedrad/default.htm) and send certificate of completion to residency coordinator
2. "Pediatric Imaging: The Fundamentals" by Lane Donnelly

Miscellaneous:

1) You get a meal ticket up to $7 at ABP for every call shift you do. These tickets are in the fellows room in the main radiology office (entrance next to Wittenborg Conference Room).
2) Personal lockers available
3) Women's (Code 1335) and Men's (Code 1351) locker rooms available

4) Resident call room available
5) Trainees are eligible for complimentary parking overnight from 5pm – 10am and for weekend parking in the BCH Patient Family Garage, located across the street from the hospital. You will need to sign up for this garage access in the parking office, just bring your BCH ID badge and your vehicle information.

Coordinator: Jane Choura
Contact: Michael George, M.D.

Ultrasound

(See additional guides on Rad Commons [http://stage.radcommons.org/residents] under the Main Menu > Sections > US tab.)
Website for "Ultrasound Policies and Protocols": http://tinyurl.com/US-Protocols-Policies

Location: L1 – enter across the hallway from Abrams conference room.

Hours: Monday-Friday, 8:30am – 5pm (since the reading room is so close to Abrams, there's very little sympathy when you're late!)

Conference: 1:30pm daily, *immediately* following noon conference (be on time!). Tech students, residents (both US and Abd-US), and fellows all attend. Usually only residents take the cases.

Responsibilities:

1. Day 1 – Mary or Carol will give you an orientation with expectations and recommended reading.
2. There is a posted schedule on the board that shows which sonographer you are assigned to each day. Have a tech or an upper year show you.
3. For the first 2 weeks, you will be working closely with a sonographer. The first week you mostly shadow then scan yourself after the tech has obtained the images (the techs call this "back scanning"). DO NOT BE SHY ABOUT SCANNING. They will expect you to know how to use the machines and get basic images by the end of the first week. *Scan whenever possible*. This is a *very* operator-dependent modality, and you *will* be the operator. The only way to learn is to practice.
4. The sonographers will write the reports at first, but you will be expected to draft the reports after a few days.
5. For the next 2 weeks - whether you're ready or not - you will scan on your own while a sonographer watches. This includes things like testicular and transvaginal scans, so don't shy away.
6. After scanning and coming up with a preliminary report, you will present to one of the attendings. The techs will show you how this works on your first day. If you are in the exam room for the scan, you are expected to present it.
7. You will spend half a day in the vascular lab (On the 2nd floor - someone will show you). You will shadow a bit, then scan if you are comfortable.
8. Help clean the exam room after the patient leaves. The tech may do this automatically, but you should help out (being a team-player and all that). The one thing that you can't do is clean the transvaginal probe. The techs are the only ones trained for that.

Official Reading: You are encouraged to follow the syllabus that will be provided.

- Ultrasonography in Obstetrics & Gynecology by Callen, http://id.lib.harvard.edu/aleph/011372492/catalog
    - Very dense, but fantastic images, worth at least looking at the images
    - If you are using requisites, this is a great supplement when you want more info/things don't make sense.
- Diagnostic Ultrasound by Rumack, http://id.lib.harvard.edu/aleph/012802081/catalog
    - Huge two volume book, but has anything you could want to know
    - Great supplement to requisites when you want more on non-OB things, highly recommend reading it

Recommended Reading: Ultrasound: The Requisites, http://id.lib.harvard.edu/aleph/012649424/catalog

- If you read this cover to cover, you'll be in great shape.

Review Reading: Core Radiology by Jake Mandell

OSCE: 15-20 cases (they change a few of them every year) on a USB drive that you pick up from the administrative office at the beginning of your last week of the rotation. Then you will schedule a time to review your answers with Mary during the last week. And while reviewing your answers, Mary will ask you additional questions about DDx, management, and physics. One of the more intense OSCEs. Mary takes it seriously and you should, too.

Advice:

1. One of the few rotations (besides mammo) where you can wear a white coat! OK to wear scrubs. There's a space by the back door for you to hang your coat and leave your bag.
2. Since this is a patient-focused rotation, make sure that you have your N95 and eye protection for any cases requiring special precautions.
3. Make sure to get to noon and then 1:30pm conference on time! The attendings are very serious about this – they would rather a sonographer take over your case and finish it for you so you can get to the conference on time.
4. Discuss with your sonographer at the beginning of the day what your goals for the day are (ex: more hands on ultrasound skills, help write up the reports, etc.). You can ask that they let you be the first to ultrasound and then they will acquire any images you are unable to obtain. Alternatively, in the beginning, you can have them do the whole exam and you can stay behind to practice ultrasounding ("back scan") while they present to the attendings
5. Learn the protocols for common exams (renal, thyroid, abdomen) or at least have a cheat sheet in your pocket. Knowing the required images will increase the chance that you can obtain the necessary images in the allotted time.
6. Everything except OB scans will get reported in PowerScribe. You will be writing these reports early and often. Depending on the day/study, these reports may get routed to different attendings (US, Abd, MSK) so be sure to ask. OB studies are reported through a unique system called UltraStar. It's quirky and not always intuitive (Peter Doubilet created it, so keep your opinions to yourself in the reading room), and the techs will help.
7. OB can feel very overwhelming at first, especially the 2nd/3rd trimester surveys (a lot of required images) – start with getting the "first panel" (cervix, placenta, amniotic fluid, baby measurements). You may not feel comfortable with these studies unless you spend extra time on ultrasound during later years!
8. Be VERY proactive about learning ultrasound skills - the earlier you try, the sooner you will become proficient. This will be one of the more frustrating rotations for many people. We all struggle with it, but it's part of the job and you'll be using ultrasound in plenty of other rotation later (e.g. MSK, IR, breast).
9. If you have time at the end of the day and the techs are willing, practice scanning on a fellow resident or tech. Hands-on experience without the pressure of a patient present can make a huge difference down the road.

Miscellaneous: Nice break room within the ultrasound department with coffee machine, fridge, microwave, water cooler, even a toaster oven. But don't dare use this room unless you're actually *on* your US rotation!
Coordinator: Linda Marquette (head tech/coordinator/runs the room!)
Contact: Mary Frates, M.D

On-Call – Consult

See this informational document for most updated policies and save it for your reference!
https://tinyurl.com/bwhradres

Location: As of 6/30/2021, after -hours residents (both Consult and Night Float) sit in Shapiro L2 CV reading room to cover the COVID-19 Shapiro scanner. This may change this year as a new ED reading room is being built.

Hours: Sunday – Friday, 7:00pm – 2:00am
The Saturday evening Consult shift will be covered on a rotating basis and will also run from 7:00pm-2:00am. Consult shifts that fall on holidays will be covered by the same resident assigned to Consult for that week.

Responsibilities and Workflow:
Refer to the First Actionable Communication Transparency (FACTs): Details for Residents document for the most up-to-date responsibilities of the Consult and NF as the duties may change over the course of the academic year.

- Shift Transitions:
  - At the beginning of the shift, call the operator to assign the #11883 Radiology Resident On-Call pager to your pager.
  - Sign-in to the shared ED Google form. This is used to give the secretaries and techs accurate information about how to reach everyone at all times! You can find your attending location/number in this list. Google doc link: https://docs.google.com/document/d/1LmPeIrDONrKZsM2g8nHWH7eWilfJInq1u8kO86XY-hg/edit?usp=sharing
  - At the end of the shift, communicate with the Night Float resident regarding any impending emergent studies (STAT abdomen CT or PE CT) or any remaining issues and sign the #11883 pager over to the NF resident's pager.

- Duties:
  - Perform preliminary interpretation on inpatient studies via ANCR system (see "documenting communication" section below).
  - Protocol inpatient CT/MR studies, and those you are called about, as appropriate; see "Special Modalities" for other modalities, and "Special Topics" (the last section in this segment) for **Neuro studies** in particular.
    - Pay attention to STAT exams when protocoling. If there is a question whether the exam is truly STAT, reach out to the ordering provider for clarification. If it is not truly STAT, either you or the provider can change the order to routine (you must document that you spoke to the provider).
    - If unsure about a protocol overnight, call the section fellow.
  - During the overlapping period between 10:30pm and 2:00am, when both the Consult and Night Float residents are on-site, inpatient cases and ED cases can be distributed at their discretion and in conjunction with the ED attending. However, the Consult resident shall preferentially be responsible for inpatient examinations.

- Preliminary Interpretation Responsibilities:
  - Any unread STAT inpatient CT, MRI, abdominal US, and MSK US, and STAT/"patient waiting" outpatient CT, MRI, and radiographs that appear on the "BH Consult After Hours" Primordial worklist.

- Any non-STAT CT, MRI, or radiograph about which the resident is called.
- If the Consult resident does not feel comfortable issuing an actionable report on an exam (e.g., CTA or MRI) or is unable to do so within a reasonable time frame due to time constraints, he/she should request that the case be reviewed by the fellow-on-call for the respective division via purple ANCR page using the "Consult" category. Make sure the **page** option is checked as the fellows are not expected to check their emails after hours.

Documenting Communication (ANCR):

- Resident:
  - The ANCR system is used to convey results to the ordering teams, as well to document discussion for the next day's Radiology attending reading.
    - ANCR connects your prelim to the general database linked to patient name, MRN, or date of birth, and can be accessed by any Brigham Health provider.

  - **ANCR (Preliminary Read) Content:**
    - Check off "not yet reviewed by attending radiologist" before starting. For "Attending (Sender)," check off "not yet assigned."
    - Prelim content should be short, succinct actionable assessments as relevant to the overnight and immediate clinical care of the patient only (rather than incidental findings that can be triaged at the time of the final image interpretation).
    - If there are multiple accession numbers for one patient, an ANCR must be generated for each STAT accession and each non-STAT accession with a critical finding. If there are multiple (non-STAT) accessions with no critical findings, a single green ANCR will suffice.
    - Generate a "sticky note" in Visage with the acronym "ANCR", to ensure that the next day's radiologist reviewing the study is aware that communication took place and where to find it.
    - See FACTS document for color coding of ANCRs.
      - Red and orange ANCRs must be sent by page.
      - Yellow and green ANCRs must be sent by page for a STAT study; for a routine study, the resident may choose whether to send by page or email.

- Attending:
  - A "Worth Another Look - Purple ANCR" system is used in the morning by attendings/fellows to provide feedback to the on-call resident on their findings written in the ANCR overnight.

Special Modalities

- Ultrasound:
  - After-hours inpatient ultrasound preliminary interpretation will be performed by the in-house sonographer.

- Nuclear Medicine:
  - All nuclear medicine studies (including V/Q, GI bleeding scans, gallium scans, etc.) are covered by the on-call Nuclear Medicine Fellow.

- Fluoroscopy:
  - In the event an inpatient fluoroscopy study is requested, the consult resident should page the Abdomen fellow for approval. If approved, resident will page the Lead technologist on

call who is stationed in the Fluoroscopy area (ext. 33880 or 33882). If the lead technologist is not available, page directly the "Tower Portable XR Technologist" at 11870 or the "Shapiro Portable XR Technologist" at 12915. If performance of the study would cause the Consult resident to be pulled from their duties outlined above for too great a time to hinder appropriate patient care, the on-call Abdominal Imaging fellow may be called to perform the study.

- Cystograms and contrast reactions.
    - You must go to Tower 9 if there is a contrast reaction or cystogram (connect the contrast to the Foley, give ~300cc or until the patient experiences pain/fullness, then make sure the FOV includes the entire bladder on the post-contrast scan while still at the scanner). Policy is no cystograms on intubated or non-responsive patients.

Special Topics:

- **Neuro**
    - The Neuro fellow stays and reads all inpatient and ED Neuro studies ***except*** noncontrast Head CTs until 11 pm. Noncontrast CT Heads are always read by consult or nightfloat based on respective ordering location (inpatient or ED).
    - Thereafter, the consult and NF resident will read all neuro studies based on respective ordering location. As with all sections, if you come upon a complicated case, you can page the neuro fellow on call overnight.

- If a referring attending requests a radiology attending opinion after hours, the resident should escalate through existing divisional procedures (page fellow who will then reach out to attending) until 11pm. After 11pm, resident should ask ED attending for review. ED attending can decide at their discretion to defer to divisional attendings based on case complexity and/or workload.

- If ever unsure or uncomfortable about an overnight situation, remember the ED attending is someone who can help you decide next steps (page fellow, talk to attending, etc).

On Call – Night Float

See this informational document for most updated policies and save it for your reference!
https://tinyurl.com/bwhradres

Location: As of 6/30/2021, after -hours residents (both Consult and Night Float) sit in Shapiro L2 CV reading room to cover the COVID-19 Shapiro scanner. This may change this year as a new ED reading room is being built.

Hours: Sunday – Friday, 10:30pm-7:30am
The Saturday Night Float shift will be covered on a rotating basis and will also run from 10:30pm-7:30am.

Responsibilities and Workflow: Similar to ED shift + Consult shift.
Refer to the First Actionable Communication Transparency (FACTs): Details for Residents document for the most up-to-date responsibilities of the Consult and NF as the duties may change over the course of the academic year.

Responsibilities and Workflow:

- Time Breakdown:
    - 10:30pm - 2:00am: Read for the ED
    - 2:00am - 7:30am: Read for the ED + takeover inpatient consult duties (see consult section)
        - During the overlapping period between 10:30pm and 2:00am, when both the Consult and Night Float residents are on-site, inpatient cases and ED cases can be distributed at their discretion and in conjunction with the ED attending. However, the Consult resident shall preferentially be responsible for inpatient examinations.

- Shift Transitions:
    - At the beginning of the shift, sign-in to the shared ED Google form. This is used to give the secretaries and techs accurate information about how to reach everyone at all times! You can find your attending location/number in this list. Google doc link: https://docs.google.com/document/d/1LmPeIrDONrKZsM2g8nHWH7eWilfJInq1u8kO86XY-hg/edit?usp=sharing
    - From 2:00am to 7:30am, the night float resident will solely cover the Resident On-Call Pager (#11883) as the Consult resident will end their shift at 2:00am. At that time, the Consult and NF residents should communicate to discuss any unresolved issues, urgent pending studies, and to confirm pager hand-off.

- Duties:
    - The NF resident will provide coverage of all ED studies, including radiographs, ultrasound, fluoroscopy, CT/CTA, and MRI.
        - ED sites include BWF (Faulkner), NWH (Newton-Wellsley), and CDH (Cooley Dickenson).
        - Refer to Emergency Radiology resident manual for details of coverage.
    - After 2:00am the NF resident also absorbs consult responsibilities. Please refer to the consult section above.

Special Topic: Neuro

- Acute stroke and cord compression MRI/MRAs on ED patients performed during the NF shift are read by the NF resident. (7am – 7pm these are covered by the Neuroradiology division and the Neuro On-Call Fellow).

- ED neuro MRI studies other than acute stroke and cord compression protocols performed during the NF shift should be reviewed and dictated by the NF resident if the requesting physician is an Emergency Medicine physician and the patient's disposition hinges on the MRI result. All tumor MRIs and MRIs requested by Neurology/Neurosurgery (patient slated for admission regardless of MRI results) may be referred to the Neuro On-Call Fellow or preliminary reads placed with final read deferred to the Neuroradiology division at the discretion of the ED attending faculty member.

Special Modalities

- Ultrasound:
  - After-hours inpatient ultrasound preliminary interpretation will be performed by the in-house sonographer.
  - Vascular ultrasounds will be performed by the Vascular US department until 5 PM during weekdays and until 3 PM on weekends.
    - After these hours, lower extremity vascular US will be performed by the ED/inpatient US technologist and all ED vascular ultrasounds will be reviewed by the ED/NF resident and ED attending faculty member.
    - For after-hours upper extremity vascular US, the NF resident should direct requests to the Vascular Lab.

- Nuclear Medicine:
  - All nuclear medicine studies (including V/Q, GI bleeding scans, gallium scans, etc.) are covered by the on-call Nuclear Medicine Fellow.

- Fluoroscopy:
  - Performance of fluoroscopy overnight is generally not feasible due to the volume of ED cases and therefore fluoroscopy studies may be deferred to the next morning.
  - Note, this is different than for the consult resident (see consult section).

- Cystograms and contrast reactions.
  - You must go to Tower 9 if there is a contrast reaction or cystogram (connect the contrast to the Foley, give ~300cc or until the patient experiences pain/fullness, then make sure the FOV includes the entire bladder on the post-contrast scan while still at the scanner). Policy is no cystograms on intubated or non-responsive patients.

Documentation of Prelim Overnight:

See Consult Section "Documenting Communication (ANCR)"

<u>On Call – In-House (Saturday/Sunday/Holidays)</u>
Location: Neuroradiology reading room in the AM and abdominal reading room in the PM. You can stay in the abdomen reading room during the consult hours (5pm - 7pm) or move to the CV reading room until the end of the shift.

Hours: 10am – 7pm

- 10am – 1pm: read neuro cases
- 1pm – 2 pm: lunch break
- 2pm – 5 pm: read abdominal cases
- 5pm – 7 pm: function as the Consult resident (see "Consult" section for responsibilities)

Responsibilities:

1. Call page operator and take over #11883 by 10am. At the end of the shift, communicate with the Consult resident regarding any impending emergent studies (STAT abdomen CT or PE CT) or any remaining issues.
2. There may be Fluoro exams waiting for you when you start the abdomen portion of the shift. These are your responsibility, not the fellow's. The fellow is responsible for all CSIR procedures. If there are Fluoro studies (there may be post-op swallows on Saturdays), coordinate with the lead XR tech in the Fluoro area. The attending will read out your images and will occasionally watch you perform the study (although usually you're on your own).
3. If paged about MSK, US, Chest cases, etc. (or Neuro or Abdomen/Fluoro when you are not assigned to that section) during the day before 5pm, you can refer the caller to the appropriate section.
4. See additional In-House shift advice on our residency website.

Moonlighting

There are various moonlighting opportunities available to residents who have obtained a MA full medical license. This is only available when you are a R2 (PGY-3) due to licensing rules in Massachusetts. You are covering contrast reactions at these sites. This happens extremely rarely and you are free to use this time to catch up on studying, watching TV, etc as long as you are physically located inside the building and immediately reachable by phone in case of a contrast reaction.

Current Moonlighting Opportunities

These are constantly subject to change, however over the last few months we have only been adding additional shifts to the schedule.

850 Boylston St
Monday - Friday 5:00 pm-8:00 pm; MRI coverage
Saturday and Sunday 7:30 am - 7:30 pm; MRI coverage

221 Longwood Ave
Mon-Fri: 5:30 pm-8:00 pm; MRI coverage
Sat: 7:00 am-7:30 pm; MRI coverage

Foxborough, 20 Patriot Place
Mon-Thurs: 6:00 pm-11:00 pm; MRI coverage
Sat and Sun: 8:00 am-8:00 pm; MRI coverage & CT coverage (until 4 pm)

West Bridgewater, 711 West Center Street
Saturday and Sunday: 8:00 am-4 or 5 pm pm; MRI coverage

850 = Brigham and Women's Health Care Center, Chestnut Hill, 850 Boylston Street, Chestnut Hill, MA 02467
221 = Brigham and Women's at 221 Longwood, 221 Longwood Avenue, Boston, MA 02115
FXB = Brigham and Women's/Mass General Health Care Center at Foxborough, 20 Patriot Place, Foxborough, MA 02035

1. Shift hours and payment are currently $70/hour.
2. Residents must stay for the entire shift, even if there are no more contrast cases for the day. This is policy as of 6/1/2021.
3. You cannot moonlight while on sick call. Moonlighting while at BCH is strongly discouraged (not part of the BWH Radiology Department and so not required to let the residents leave early).
4. In addition to obtaining a MA full medical license (you must be a PGY-3 or higher), a couple moonlighting credentialing forms are required and are handled by Sandi Palma:
    a. CRICO form
    b. Letter from Program Director

Contact: Manoj Jagani, M.D. (Resident Moonlighting Coordinator from February 2021-February 2022)

Important Websites

BWH Radiology Residency Website (stage.radcommons.org/residents/)
Main website where you can find information on everything ranging from phone numbers to protocols to expectations and guidelines for each rotation. Login with Partners username and password. Majority of the websites below are linked to on the Residency Website under Important Links and Misc Links.

Amion (amion.com)
Passwords
Resident Schedule: bwhrad - Here you can find your general schedule as well as when you're assigned to Autopsy Conference, HMS teaching, Saturday ED shifts etc. Click on the top "Call" tab and scroll through the months to find your assignments based on the first two letters of your last name. You should find out when you're assigned to Autopsy conference etc early so that you can plan accordingly.
General Brigham schedule (including most of the Radiology divisions): bwh
Some radiology divisions (the above general Brigham schedule is more inclusive): bwh rad
ED schedule: bwh erad
Abdomen fellow schedule: bwh airma
Abdomen Attending schedule: aii staff
More listed on Residency Website under Phone List

*Tip: click "my schedule" icon to the right of "Shift" button on your home computer to generate a personal schedule, which can then synced to Google Calendar, Apple iCal, iPhone, or Outlook.

Partners email (outlook.office365.com/owa)
Microsoft Outlook Web Access (OWA)

MyProfile (myprofile.partners.org)
Update your contact information

Partners Workspace (workspace.partners.org)
Remotely log in to EPIC, PowerScribe, Visage, among other tools, all from home. Log in does not require VPN. Once logged in, you can open up a web browser (for example, UpToDate) and use the browser as a backdoor to access any intranet websites.

Countway Library (countway.harvard.edu)
HMS medical library, login with eCommons login (see below) for access to electronic journals. A number of radiology textbooks, including several from the Requisites curriculum, are available digitally through this portal.

HarvardKey (key.harvard.edu)
HarvardKey is Harvard University's unified online user credential, uniquely identifying you to Harvard IT applications and services to grant you access to the resources you use every day. You will need HarvardKey and then Duo Mobile on your cell phone as two-step verification in order to access Countway Digital Library, for example.

New Innovations (new-innov.com)
Login Institution: partners
Username: first initial and last name (e.g., ggaviola)
Password: same as Username
Check daily conference schedule and complete rotation and faculty evaluations.
Conferences > Calendar
Evaluation > Complete an Evaluation

Dropbox for BWH Radiology Residency (dropbox.com)
Username: bwhradresidents@gmail.com
Password: brighamradresidents
Tip: The tutorials for teaching HMS students can be found in the residency dropbox under the "HMS Teaching" folder). Scheduling for teaching on these respective rotations can be checked through Amion.
See: https://rc.partners.org/kb/article/2750, to set up Dropbox Business account through Partners

RADPrimer (radprimer.com)
Image-rich multiple-choice question bank. Thousands of questions and learning modules. A fantastic resource. Subscription provided by program.

STATdx (my.statdx.com)
A differential diagnosis and imaging atlas online resource. Subscription provided by program.

e-Anatomy (www.imaios.com/en/e-Anatomy)
Outstanding interactive radiologic atlas of human anatomy. Subscription provided by program.

RSNA/AAPM Physics Modules (www.rsna.org/Physics-Modules/)
Required to complete these Physics Modules during residency. Make sure to save PDFs of your complete certificates.

myRSNA (myrsna.rsna.org)
Personal portal for your RSNA account. Here you can upload items to your RSNA portfolio to document your progression throughout residency, under "myPortfolio." There will be separate meetings throughout residency regarding this process and what you'll need to do.

ANCR (ancr.partners.org)
Check and/or send ANCR critical result alerts through web portal when you are not at a radiology workstation. Partners login required.

HealthStream (www.partners.org/healthstream or https://partnershealthcare.okta.com/login/login.htm)
Select "BWH Provider Services"
Online training, attestations, and other required modules for compliance with hospital policies.

SharePoint (sharepoint.partners.org)
Another departmental intranet resource. (VPN/Partners login required)
Tip: Sharepoint is used heavily by the Abdominal section, where you can find a calendar for morning conference, recommended reading, and other helpful information.

PeopleSoft (ibridge.partners.org)
Elect benefits and investments, view paychecks, elect beneficiaries for insurance policies, submit expense reports. (Partners login required)

PHS NetBenefits (netbenefits.com/partners)
Partners portal for Fidelity / investment elections for savings. In addition to the standard "Retirement Target" or "Tier 1" mutual funds, there are also a number of "Tier 2" mutual fund options from selected groups (ranging in risk from global equity to money market funds), as well as an "open choice" option to enroll in "BrokerageLink," which allows one to entirely direct investments if that is desired. Both traditional (pre-tax) and Roth (post-tax) 403(b) savings options have been available in the past.

PHS GME (https://www.partners.org/Graduate-Medical-Education/Residents-Clinical-Fellows/Default.aspx)
Partners GME > Information for Current Residents and Fellows. Benefits, Housing, Childcare, Living in Boston, Financial planning. GME Policies. Sample contract templates and resident salary payscale by post-graduate year.

VPN Instructions (rc.partners.org/remoteaccess/vpn/)
Provides information on how to obtain VPN remote access. On this page, there is a link that must be accessed from a Partners intranet computer to submit your remote access request.
Tip: Additional instructions on various topics can be found att: https://rc.partners.org

IS Service Desk (https://partnershealthcare.service-now.com/phsess/ or https://partnershealthcare.okta.com/login/login.htm)
Submit your own help desk tickets for IT-related issues.

Radiology Research Projects Database (http://radiology.bwh.harvard.edu/research/project-list)
Password-protected online database of projects posted by BWH staff (attendings, fellows, administration, residents, etc...) looking for medical student and/or resident involvement. Login with Partners username and password.

eCommons (ecommons.med.harvard.edu)
Harvard medical intranet, gateway to various online resources at Harvard Medical School, used to gain access to the Countway Digital Library.

Harvard University ID [HUID] is required for library access, which you will receive when your obtain your Harvard ID Card… in fact, the HUID is the first 8 digits of the Harvard ID number printed on your card.

How to Get Harvard ID Card / HUID Number: Go to office on 1st floor of Kresge Building, School of Public Health, next to Countway Library (M-F, ~8:30am - 4:30pm).

Partners PPD Directory (ppd.partners.org)
Quickly look up contact information for any staff member within the Partners system. (VPN and Partners login required)

Research Information Science & Computing (RISC) (rc.partners.org)
"Getting Started > New to Partners" website: https://rc.partners.org/support-training/getting-started/new-partners; and other helpful information linked from their main website

Partners Research Navigator (partnershealthcare.sharepoint.com/sites/phrmportal)

MA Board of Registration in Medicine (https://medboard-online.med.state.ma.us/OLR/Public/Default.aspx)
Website for the Massachusetts Board of Registration Medicine. Renew your license online, or download the forms you need to complete your Full License application (required for moonlighting).

myABR (myabr.theabr.org)
Personal portal for the American Board of Radiology. Here you can register, pay annual ABR dues, etc.

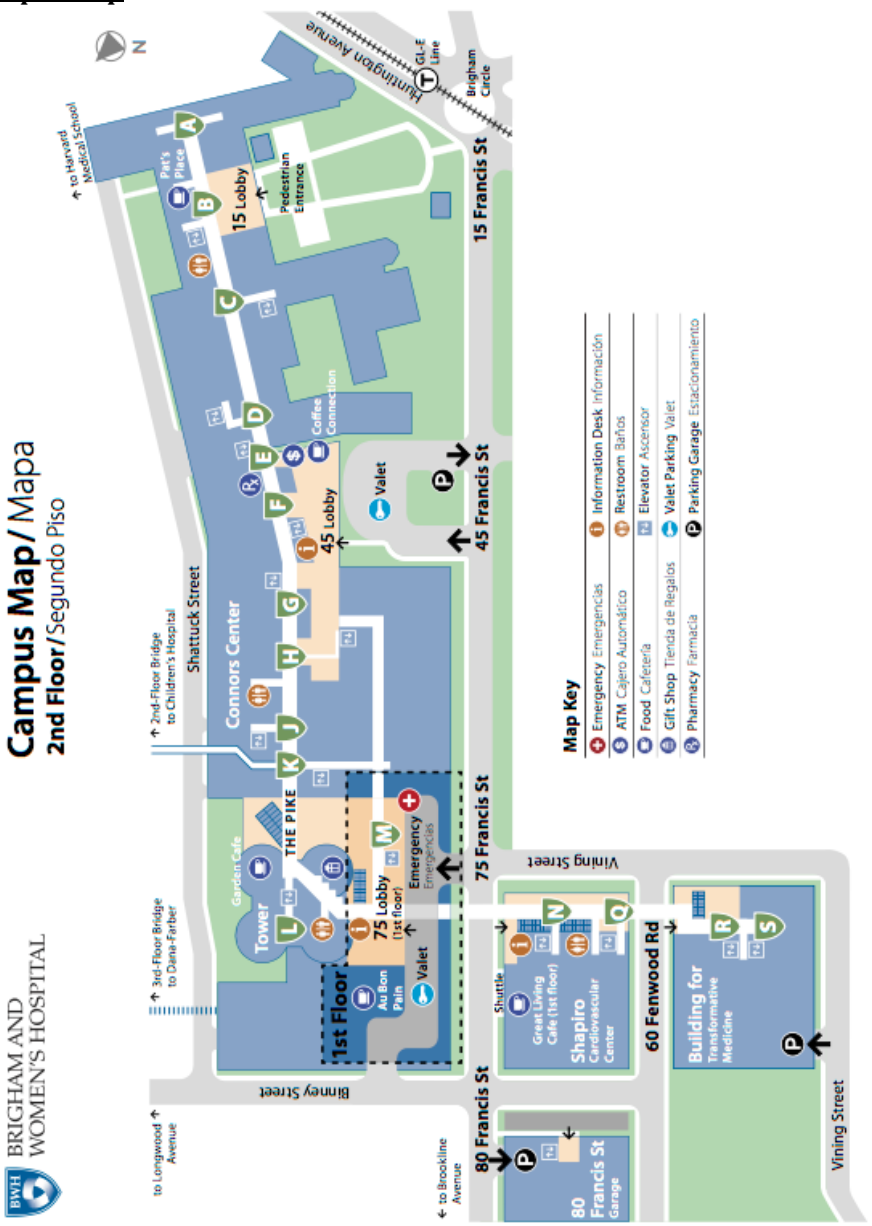
RadCommons (radcommons.org)
BWH Radiology private departmental intranet, where the Residency Website is hosted. See the "e-orientation" in particular for helpful information. Also available here is information concerning quality assurance metrics for customer service, exam volume, productivity, and reporting. (VPN/Partners login required)

MIRC (mirc.partners.org)
This is an internally accessed searchable case-based teaching file, containing patient presentations, and case descriptions. Images are submitted by both residents and faculty directly from the PACS system. (VPN Required)

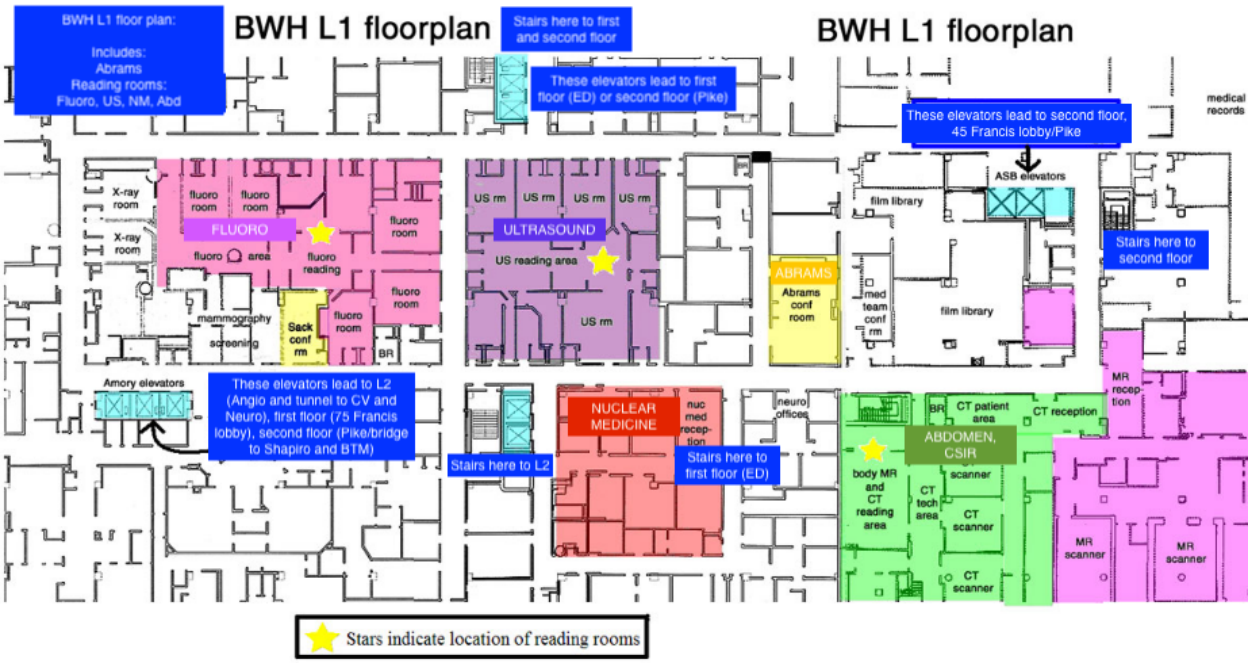
Mobile LMR (lmr.partners.org)
iOS optimized longitudinal electronic medical record, which can be used to look up patient information on the go. (Partners login required)

NASCI Curriculum (nasci.org/Home/Sandboxformodules/CardiovascularImagingCurriculum.aspx)
Table of contents for North American Society for Cardiovascular Imaging topics and associated articles. Excellent resource for the CV rotation.

Campus Map


BRIGHAM AND WOMEN'S HOSPITAL
Campus Map/Mapa
2nd Floor/Segundo Piso
N
to Harvard Medical School
Huntington Avenue
GL-E Line
Brigham Circle
Pat's Place
15 Lobby
Pedestrian Entrance
15 Francis St
Coffee Connection
45 Lobby
Valet
45 Francis St
2nd-Floor Bridge to Children's Hospital
Shattuck Street
Connors Center
THE PIKE
Garden Cafe
Tower
3rd-Floor Bridge to Dana-Farber
1st Floor
Au Bon Pain
75 Lobby (1st floor)
Valet
Emergency Emergencias
75 Francis St
Vining Street
Binney Street
Shuttle
Great Living Cafe (1st floor)
Shapiro Cardiovascular Center
60 Fenwood Rd
Building for Transformative Medicine
to Longwood Avenue
to Brookline Avenue
80 Francis St
80 Francis St Garage
Vining Street
Map Key
Emergency Emergencias
Information Desk Información
ATM Cajero Automático
Restroom Baños
Food Cafeteria
Elevator Ascensor
Gift Shop Tienda de Regalos
Valet Parking Valet
Pharmacy Farmacia
Parking Garage Estacionamiento

L1 Map


BWH L1 floor plan:
Includes:
Abrams
Reading rooms:
Fluoro, US, NM, Abd
BWH L1 floorplan
Stairs here to first and second floor
These elevators lead to first floor (ED) or second floor (Pike)
BWH L1 floorplan
These elevators lead to second floor, 45 Francis lobby/Pike
medical records
ASB elevators
X-ray room
X-ray room
fluoro room
fluoro room
FLUORO
fluoro area
fluoro reading
fluoro room
fluoro room
mammography screening
Sack conf rm
fluoro room
BR
US rm
US rm
US rm
US rm
ULTRASOUND
US reading area
US rm
ABRAMS
Abrams conf room
film library
med team conf rm
film library
Stairs here to second floor
MR recep tion
Amory elevators
These elevators lead to L2 (Angio and tunnel to CV and Neuro), first floor (75 Francis lobby), second floor (Pike/bridge to Shapiro and BTM)
Stairs here to L2
NUCLEAR MEDICINE
nuc med recep-tion
Stairs here to first floor (ED)
neuro offices
BR
CT patient area
CT reception
ABDOMEN, CSIR
body MR and CT reading area
CT tech area
CT scanner
CT scanner
CT scanner
MR scanner
MR scanner
Stars indicate location of reading rooms